The Chemical Age

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NOTICES.—All communications relating to editorial matter should be addressed to the Editor, who will be pleased to consider articles or contributions dealing with modern chemical developments or suggestions bearing upon the advancement of the chemical industry in this country. Communications relating to advertisements or general matters should be addressed to the Manager.

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With this issue is published an Index to Volume XXV of THE CHEMICAL AGE, *covering the period July to December, 1931, inclusive.*

The Turn of the Tide

THAT British industry is approaching, if it has not already reached, the turn of the tide, is the view expressed by Sir Harry McGowan, chairman of Imperial Chemical Industries, than whom, on account of his personal knowledge and experience, no one is better qualified to speak on behalf of the British chemical industry. In an optimistic interview with the *Observer* last week-end, Sir Harry stated that since the suspension of the Gold Standard trade in heavy industries had definitely improved. His company's sales of heavy chemicals in this country for the week ended December 21 were the best for two years, and in certain lines there is an increasing output and the company is taking on more workpeople. While not prepared to prophesy, which is always dangerous, Sir Harry feels strongly that if we can get a settlement of the German financial problem we shall see a steady improvement in commerce and industry in this country. Repercussions throughout the world from a non-solution of that problem would, indeed, be so serious that a settlement will have to be made, even if only of a temporary character.

As to the implications of a tariff, he holds that it must be scientifically thought out and administered, and not rushed, as we cannot afford to allow any of our industries to be prejudiced by having to pay much more for goods produced in this country because they are not being imported. If the price of foodstuffs is controlled, thereby helping to keep down the cost of living, Sir Harry sees no reason why in many cases a tariff should mean increased cost. To give an illustration, he promises that if his company sees, say, in one of its principal products an increase of 15 to 20 per cent. in its output because of increased demand by reason of its customers being protected, it will reduce its selling prices, and not increase them.

Looking at the country as a whole, Sir Harry sees evidence of a determination on the part of many industries to become more efficient. The past eighteen months has given everyone an opportunity of putting in the pruning knife to a large extent, which, of course, makes for efficiency. The time is opportune for great manufacturing industries, not necessarily cognate, to come into contact and exchange views on the conduct of their business, which must have a beneficial effect all round. This applies to research, manufacturing processes and selling. No one has a monopoly of the knowledge of these things, but if the knowledge that exists is pooled, then the benefit to the industries concerned, and to the country at large, will be considerable.

Progress in Fuel Research

AN important review of the general economic principles underlying all processes for the treatment of coal by low temperature carbonisation is contained in the Report of the Fuel Research Board for the year ending March 31, 1931, to which reference is made on pp. 23-24. The products concerned are smokeless semi-coke suitable for burning in the open domestic grate, a yield of gas less than that obtained from the high temperature processes, and liquid fuels and tar. It is pointed out that each of these products has to compete directly with a material already on the market, and that the economic results possible with any given coal and type of plant will depend on local conditions. Low temperature coke amounts to 55 to 75 per cent. of the coal carbonised, and as a domestic fuel it is generally more efficient than raw coal. The commercial value of the gas obtained depends entirely on the purpose for which it can be used. The tar yield can be separated into light and heavier oils, with a residue of pitch which may amount to 50 per cent., and the crude tar may be used as a fuel, but it is not miscible with petroleum oils. The yield of motor spirit which is obtained by

refining processes alone is, however, only about three gallons per ton.

This Report describes at length the progress which has been made in important experiments on the conversion of the tar into motor spirits and heavier oils. In one series of experiments the whole tar yield was treated with hydrogen at high pressures and temperatures, while in a second series the lighter fractions were treated with hydrogen at atmospheric pressures. In the first series, taking 20 gallons of tar as the average yield per ton of coal carbonised, 14 gallons of motor spirit were obtained, together with 6 gallons of pitch-free Diesel fuel oil. Some experiments have also been carried out on gasworks tar. The results are, so far, not so good as with low temperature tar, more hydrogen being used in the conversion into motor spirit. In view of the extremely low market price for tar at the present time, however, the process may be of considerable industrial importance in the near future, and research on the subject is being actively pursued. The results obtained at the Fuel Research Station with a small continuous conversion plant designed for a throughput of 3 to 6 gallons of tar per day show that it will be possible to proceed during the coming year with the design and erection of a larger plant with every prospect of success. Further research will also be carried out on "cracking" treatments for the tars and on the treatment of vapour from the retorts before condensation. The production of road tar and pitch for various purposes will also be examined. To provide a supply of tars of known origin for the experiments it is proposed to erect at the Fuel Research Station two intermittent vertical gas ovens of the latest commercial type. These will be arranged so that it is possible to employ a range of carbonisation temperatures between 600° C. and 1,000° C., which is intermediate between those used in current low temperature carbonisation and in gas retorts. It is thus hoped to find the optimum conditions of working in various circumstances.

Progress made in the survey of the national coal resources of the country is also reported upon. The organisation of the survey is now practically complete and covers some 96 per cent. of the coal raised. It is yielding important information of the utmost value on the best use to which coal of various qualities can be put, and how various coals may be most advantageously marketed. Although the examination of the coals from a number of collieries is still to be completed, the results so far available have been published with the permission of the colliery companies concerned.

Buy British

WE must never let the words "Buy British" become a mere parrot cry, a form of words simply to be posted on the hoardings and bandied across the counter. The Prince of Wales used these words in inaugurating the "Buy British" campaign last November, and he added that if "Buying British" was to be made a reality there must be good honest team work all along the line. We make no apology, therefore, for laying emphasis upon the letter from Mr. J. Davidson Pratt, secretary of the British Chemical Plant Manufacturers' Association, which appears in another column. As Mr. Pratt truly says, the British chemical plant industry has proved its ability to provide the most up-to-date apparatus and machinery at reasonable prices, so that there is little, if any, need for plant users to go abroad for their requirements. Despite the plant manufacturers' efforts, however, there have been quite a number of bad cases recently in which the users of chemical plant have obtained their requirements from abroad, without even giving the British manufacturer an opportunity to quote. This is a serious state of affairs at a time of national emergency such as the present, and we heartily endorse Mr. Pratt's appeal to chemical manufacturers to co-operate with his Association in order to ensure that British chemicals shall be made with British plant.

The Calendar

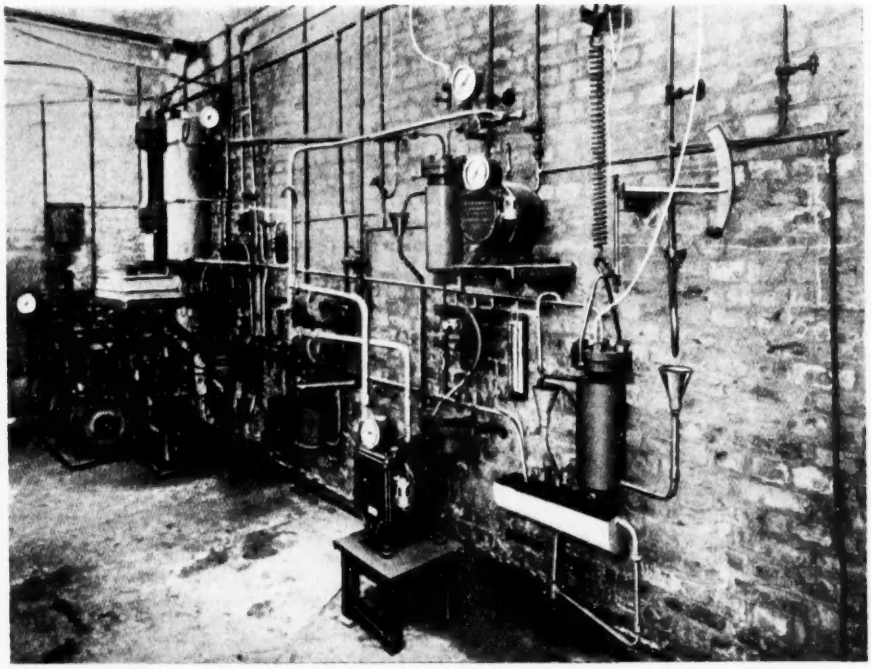
January	11	Institute of Metals (Scottish Section): "Some Properties of Fire-Bricks." H. C. Biggs. 7.30 p.m.	39, Elmbank Crescent, Glasgow.
	11	Institution of the Rubber Industry: "Testing Anti-Oxidants." Dr. H. J. Stern and W. Puffett. "The Measurement of Water Absorption by Rubber." Dr. H. A. Daynes. 7.30 p.m.	First Avenue Hotel. London.
	12	Institute of Metals (Birmingham Section): "Stainless Steel." J. H. G. Monypenny. 7 p.m.	Chamber of Commerce, New Street, Birmingham.
	12	Institute of Metals (N.E. Coast Section): "Defects in Non-Ferrous Castings." R. Dowson, S. G. Homfray and A. Logan. 7.30 p.m.	Armstrong College, Newcastle-on-Tyne.
	12	Institution of Petroleum Technologists: "The Chemistry of the Conversion of Algae into Bitumen and Petroleum and of the Fucosite-Petroleum Cycle." J. E. Hackford. 5.30 p.m.	John Street, Adelphi, London.
	12-13	Faraday Society: General Discussion on "The Adsorption of Gases."	Oxford.
	14	Oil and Colour Chemists' Association: "Earth Colours." W. Armstrong Storey. 7.30 p.m.	30, Russell Square, London.
	14	Institute of Metals (London Section): "X-Ray Examination of Alloys." G. D. Preston. 7.30 p.m.	83, Pall Mall, London.
	14	Institute of Chemistry (Manchester Section): Discussion on the "Teaching of Applied Chemistry, Facilities for Specialised Post-Graduate Work." C. H. Creasey.	Manchester.
	14	Society of Chemical Industry (Yorkshire Section) and Institute of Chemistry (Leeds Section): "Recent Developments in the Treatment of Boiler Waters." Dr. A. W. Chapman.	
	14	Society of Chemical Industry (Nottingham Section): "Lime and Limestone." W. Woodhouse.	University College, Nottingham
	15	Chemical Engineering Group: "Making and Breaking Emulsions." W. Clayton.	Burlington House, London.
	15	Society of Chemical Industry (Manchester Section): "Some Aspects of Boiler Water Chemistry." H. E. Jones. 7 p.m.	17, Albert Square, Manchester.
	15	Institute of Metals (Sheffield Section): "Stresses in Metals." A. Wragg. 7.30 p.m.	University, Sheffield.
	15	Society of Dyers and Colourists (Manchester Section): "Beam Dyeing with Vat Colours." J. R. S. Goodall. 7 p.m.	College of Technology, Manchester.
	15	Society of Chemical Industry (South Wales Section): "The Future of Liquid Fuels."	Neath.

The By-Products of Coal

Recent Progress in Low Temperature Carbonisation and Hydrogenation

The general economic principles underlying all processes for the treatment of coal by low temperature carbonisation are reviewed in the Report of the Fuel Research Board for the year ended March 31, 1931, which has been issued by the Department of Scientific and Industrial Research (H. M. Stationery Office, price 2s net).

In a general review of the work accomplished during the year, which prefaces this Report, Sir Richard Threfall, the Chairman of the Fuel Research Board, points out that the experiments on the conversion of low temperature tars to motor spirit and oil, with the elimination of pitch, have now reached a stage where larger scale experiments are desirable. The treatment of these tars, so as to convert them into higher-priced products, is one of the most pressing needs of the low temperature carbonisation industry, and it is proposed to proceed with larger scale experiments directed to this end. The treatment of tars for the production of motor spirit and other oils forms one method of producing, from home sources, some of the oil fuels at present imported, at a cost of some £40,000,000 a year. Another method by which oil can be obtained from coal is that known as hydrogenation, and of all methods at present available, this produces the greatest quantity of oil, with the minimum of other products, per ton of coal used. At the present world prices of oil and coal, and with our present knowledge of the methods of treating the coal, hydrogenation processes cannot compete on a cost basis with natural oils.



Small Continuous Plant for the Hydrogenation of Tar at H.M. Fuel Research Station.

"Low Temperature" Tars and Spirits

As stated in previous Reports the study of the chemical constituents of "low temperature" tars is undertaken at the Department's Chemical Research Laboratory at Teddington, and the results published from time to time by Professor G. T. Morgan, the Director of Chemical Research and his staff. The work at the Fuel Research Station has been directed more to treatment of the tars so as to improve their value as fuel, and in particular to obtain from them the maximum amount of pitch-free oil and motor spirit.

A full report has now been published, in Fuel Research Board *Technical Paper No.* 32, of a long investigation dealing with the treatment of tars by distillation and by the use of solvents to remove the pitch, and an investigation of the differences in composition of tars produced from various coals at varying temperatures of carbonisation. The experiments on the effect of temperature of carbonisation were carried out in the small horizontal retorts at the Fuel Research Station, and tests were made at temperatures of 400° to 700° C., varying by steps of 50° C.

Some account of the programme of work on the conversion of tar into motor spirits and heavier oils was given in the last Report. The laboratory work has been carried out on two lines, the one deals with either the whole of the tar, or that portion boiling above 230° C., and consists in treating the tar with hydrogen, in the presence of catalysts at high temperatures and pressures, and the other deals only with the lighter fractions which are treated at atmospheric pressures. It was mentioned in the last report that the best results on the heavier fraction were obtained with the use of molybdic acid and sulphur as a catalyst. The use of molybdenum in numerous forms has therefore been studied to determine its most efficient form, the best support on which to use it and the effect of specific poisons which might cause it to deteriorate. The work has been confined to static experiments in the two-litre pressure vessels and an investigation on the deterioration of the catalyst with continued use has been deferred until it can be carried out in the small continuous apparatus mentioned below.

The work is not sufficiently far advanced to sum up the results in a few generalisations, but some points of interest may be mentioned. The largest conversion to spirit has been obtained by using active charcoal, or silica gel, impregnated with ammonium para-molybdate, with sulphur added separately. Sodium and chlorine in very small amounts rapidly destroy the efficiency of a molybdenum catalyst. Thus, sodium molybdate has very little catalytic effect on the reaction whereas ammonium molybdate is a good catalyst.

Again, the good effects of ammonium molybdate are destroyed by the addition of sodium carbonate. Traces of chloroform or hydrochloric acid also destroy the activity of the molybdenum. Water and ammonia in some cases exert a profound influence on the course of the reactions when using a molybdenum catalyst, but the mechanism of their actions has not yet been elucidated.

Experiments have been carried out using the whole crude wet low temperature tar to ascertain the necessity or otherwise of a preliminary distillation, or topping of the tar. By the use of the ammonium molybdate-charcoal-sulphur catalyst the volume of oil obtained is the same as that of the original tar. Thus, if 20 gallons of tar are assumed to be the average yield of tar by the low temperature carbonisation of one ton of bituminous coal, then the yield of oil by one conversion, using the above-mentioned catalyst, is 20 gallons and of this amount there are nearly 14 gallons of neutral oil boiling below 230° C., two-thirds of which boil below 170° C.; there remain 6 gallons of pitch-free oil, which can be used as a Diesel fuel without further treatment. The volume of hydrogen actually absorbed in effecting this conversion of 20 gallons of tar is 1,250 cu. ft. Some experiments have also been carried out using tars produced at higher temperatures of carbonisation, and although the yields of spirit are good, they are not as good as those obtained from tars made at lower temperatures. The results so far obtained show that the higher the temperature of carbonisation, the more the hydrogen used and the lower the conversion into spirit. The high temperature tars have not been examined in detail as yet, and it is possible that the use of a more suitable catalyst may improve the conversion.

Conversion of Tar Acids to Hydrocarbons

Fischer (*Ges. Abh. Kennt. Kohle*, 1921, *6*, 128, 145) claimed that phenols and low temperature tar acids could be converted to aromatic hydrocarbons in good yields (up to 70 per cent. of the substance used or 98 per cent. of the theoretical yield of benzene) by passing the vapour of the phenols together with excess of hydrogen through a tinned iron tube at 750° C. Experiments have been carried out in an attempt to reproduce these results, but iwthout success. Ortho-, meta- and para-cresols and low temperature tar acids gave products containing, on the average, about 40 per cent. of neutral oil boiling below 170° C., 15 per cent. boiling above 170° C., 15 per cent. of phenols, and 25 per cent. of gas. A number of catalysts on different supports were tried; several had an appreciable effect, but the most effective was found to be active charcoal impregnated with ammonium paramolybdate and reduced with hydrogen. It was found that with this catalyst, and at a temperature of 450° C., phenols could be completely converted by hydrogen into aromatic hydrocarbons without the production of much gas, i.e., the reduction of the hydroxyl group takes place without the loss of side chains.

In the reduction of meta-cresol the excess of hydrogen, the time of contact and the reaction temperature have, each in turn, been varied with the object of determining the optimum conditions. At 450° C., with four times the theoretical amount of hydrogen for the reduction of cresol to toluene, and a time of contact in the reaction chamber of 18 secs., complete reduction to toluene was effected with a yield of 90 per cent. of the theoretical and the catalyst increased in weight by about 4 per cent. The increase in weight of the catalyst is assumed at present to be due to deposition of carbon owing to the breaking down of the phenol molecule by oxidation by the catalyst. The catalyst eventually loses its activity, with the result that unconverted phenols appear in the product. Experiments were therefore directed towards a reduction in this increase in the weight of the catalyst. It has been found that by decreasing the time of contact to ½ sec. and increasing the excess of hydrogen to ten times the theoretical, the increase in weight of the catalyst can be reduced to negligible dimensions and the yield of the product is then 96 per cent. of the theoretical.

On applying these conditions to the reduction of low temperature tar acids, distilling below 230° C., a product containing no tar acids and amounting to 85 per cent. of the theoretical was obtained. The increase in weight of the catalyst (6 per cent.) was greater than that obtained with cresol. The whole fraction of low temperature tar boiling up to 230° C. has also been treated and the tar acids contained in this fraction were reduced to neutral oil. The increase in weight of the catalyst was, however, large, amounting to 10 per cent. of the weight of the material used.

Conversion of Tar into Motor Spirit

In the Report for the year 1929-30 it was mentioned that a continuous apparatus for hydrogenating tar had been designed and was being erected. Various mechanical difficulties have had to be overcome in designing and erecting a continuous apparatus for the hydrogenation of tar, but this small scale plant has now been completed, and is being tested. The designed throughput is 3 to 6 gallons of tar per day, the temperature of the reaction being about 450° C., and the pressure up to 200 atmospheres.

This plant is shown in the accompanying illustration. The convertor, seen on the left, with the front half of the electrical furnace removed, is a steel cylinder with flanged ends bolted on. Tar is fed in through the top flange of the convertor, and hydrogen near the base. The catalyst is placed in suitable containers inside the convertor or it may be pumped in with the tar. Some experiments have been carried out with a series of inverted cups containing the catalyst, the tar and hydrogen passing through counter current. A pump can be used to give the ingoing hydrogen rapid pulsations. Two thermocouples are inserted in the convertor, in the top and bottom respectively, and additional ones between the furnace and the convertor, for the control of the temperature. The vapour from the reaction, together with any excess hydrogen, passes from the convertor near the top into a condensor, and thence into a high pressure receiver, from which the liquid is drawn off into a receiver at atmospheric pressure, and the gas passes, via control valves and meter to a gasholder.

The tar residue from the base of the convertor passes to a second high pressure receiver with an outlet at the bottom leading to another atmospheric vessel. A valved connection is made between this receiver and the residual gas outlet pipe in order to balance the pressure. Any gas given off, due to the drop in pressure, from the liquids in the atmospheric pressure vessels passes through one or other of two active charcoal scrubbers, the stripped gas passing through a meter to a gas holder. When saturated, each scrubber is electrically heated to drive off the spirit and reactivate the charcoal, the vaporised spirit being condensed and drawn off at intervals. Steam and water connections are made to the tar pump, high pressure receivers, condensers, pipes, etc., so that they may be heated or cooled as required.

(To be continued.)

The New Duty on Aluminium Sulphate

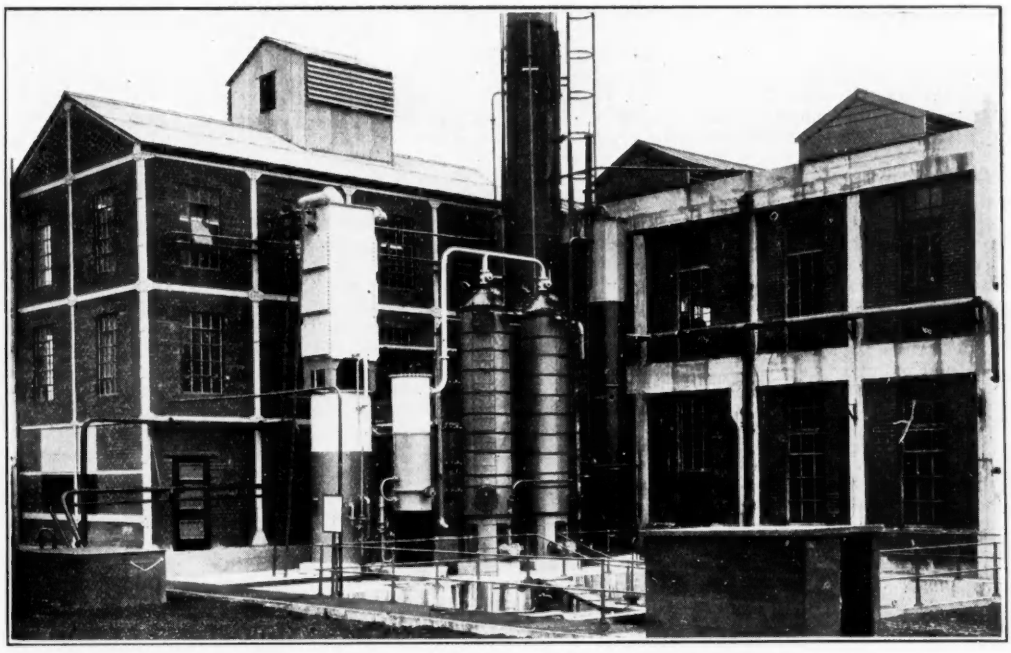
A Criticism of Customs Returns

UNDER the Abnormal Importations (Customs Duties) No. 3 Order of the Board of Trade, which came into operation on December 19, a duty of 50 per cent. is imposed on a number of chemicals, including aluminium sulphate. It would appear, however, from a communication which we have received from one of the companies affected by the Order, that the imposition of the new duty on aluminium sulphate has been influenced by clerical errors in H.M. Customs Statistical Returns, as in the returns for November, 1931, there was included an item of 620 tons of aluminium sulphate imported into a Scottish port.

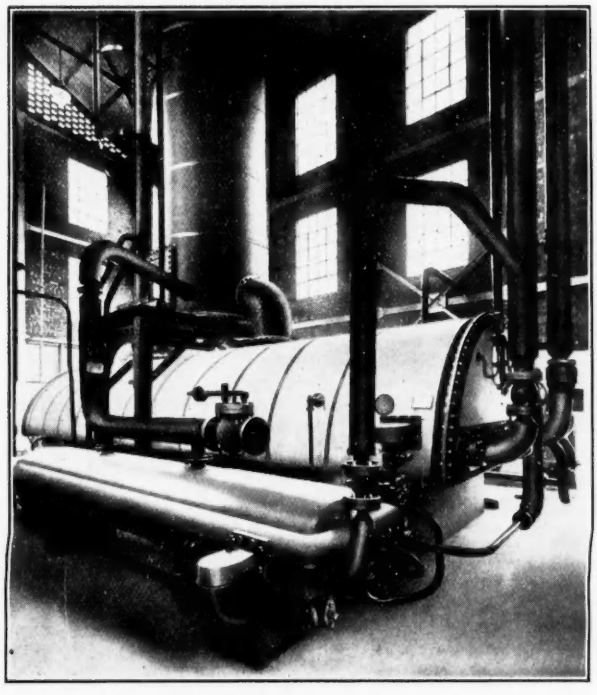
The importers have addressed a letter to the Board of Trade in the following terms: "It has been brought to our notice that our shipment of approximately 620 tons of sulphate of ammonia imported during November has been returned through Customs Bill of Entry as 'sulphate of aluminium.' As this is evidently a clerical error, we feel it is only right that your attention should be drawn to this matter so that the necessary amendment can be made."

H.M. Customs Returns of aluminium sulphate imported during the past four years give the following figures: 1928, 24,297 tons; 1929, 23,851 tons; 1930, 22,118 tons; 1931, 21,907 tons. These returns are for the first eleven months of each year, and the 1931 figure includes the 620 tons of sulphate of ammonia incorrectly stated to be aluminium sulphate.

From these figures it is difficult to justify the claim that the imports of aluminium sulphate during 1931 were abnormal, and consequently, in the opinion of the company which has raised the complaint, this duty has been levied unjustly under the interpretation of the Abnormal Imports Act.



General View of Dephenolating Plant at Partington Gasworks, Manchester.



Close-up Interior View.

The accompanying illustrations show the dephenolating plant installed at Partington Gasworks, Manchester. The process employed for dephenolating the gas liquor consists in preheating this liquor to 45° C. and washing it with benzol on the counter-current principle in the ratio of 60-70 parts of benzol to 100 parts of liquor, in a tower fitted with perforated trays. Successful commercial operation depends largely upon the quantity of benzol lost in the process, and for this reason the plant is equipped with activated carbon filters for the extraction of the dissolved benzol in the dephenolated liquor. The average throughput of liquor is 16,800 gallons per day. The amount of crude phenol recovered is 80 to 100 gallons per day.

Recovery of Tar Acids from Gasworks Liquor.

The Cellulose Esters of Higher Fatty Acids

A Review of the Patent Literature

Although cellulose acetate is at present the only cellulose ester of economic significance, some of the esters of the higher fatty acids possessing properties likely to render them of technical importance can now be derived from commercial oils and fats. It must not at the same time be overlooked that benzyl cellulose is probably the derivative most likely to rival nitro-cellulose, cellulose acetate, and ethyl cellulose in the near future.

THE early history of cellulose acetate records the difficulties experienced in producing a material soluble in cheap solvents, the method introduced by Lederer of acetylating with acetic anhydride in the presence of sulphuric acid finally paving the way for a technically useful acetate. The same disadvantage was involved in the earlier esters containing radicals of higher fatty acids. It might, however, be mentioned that Cross and Bevan's cellulose benzoates were soluble in benzole. The cellulose hexapalmitate (based on the C_{12}- formula) of Karrer, Peyer and Zega (*Helv. Chim. Acta*, 1922, 863) was easily soluble in chloroform but not in any common solvents, whilst as recently as 1926, esterification of cellulose with higher fatty acid chlorides and anhydrides failed to yield soluble esters (*vide* papers by Kita, Mazume, Sakurada and Nakashima in *Kunststoffe*, 1926). The esters obtained by Grün and Wittka (*Z. angew. Chemie*, 1921, *34*, 645) were likewise characterised by unsatisfactory solubility properties.

Starting Points in Manufacture

Soluble cellulose esters of higher fatty acids were prepared by Gault and Ehrmann (*Bull. Soc. Chim.*, 1923, 123; U.S. Pat. 1,553,924; French Pat. 566,124) as a result of using hydrocellulose as the raw material for esterification. The increased solubility of the resulting esters might therefore be brought about by partial degradation of the original cellulose. Soda cellulose has also been used as the starting-point for esterification, for example, in the above-mentioned papers of Kita and co-workers, but definite statements as to the solubilities of the resulting esters do not emerge. Soluble esters have also been obtained by the direct action of acid chlorides or anhydrides, in the presence of an acid-binding agent such as a tertiary base, on (a) cellulose, (b) partially esterified cellulose, e.g., cellulose acetate, (c) soda cellulose, (d) hydrocellulose and by the action of higher fatty acids themselves on partially esterified cellulose. The nomenclature followed in this article is based on the $C_6H_{10}O_5$ formula.

British Patents 305,947*, 297,766, and 283,181, concern the application of the principle that a temperature of 100° C., or higher, in the course of the reaction with fatty acid chlorides enables good solubility to be achieved. One or more acid chlorines can be employed simultaneously or in succession, giving rise to mixed esters such as the mixed cellulose esters of lauric acid and whale-oil acid or the mixed ester of butyric and ricinoleic acids, both being soluble in aromatic hydrocarbons and halogenated aliphatic hydrocarbons. The reaction of an esterified or etherified cellulose derivative (which still contains one or more free hydroxyl groups) with chlorides of higher fatty acids is mentioned in Brit. Pat. 300,942 and 334,897, examples being cellulose stearate acetate and ethyl cellulose myristic acid ester, both soluble in common solvents. It will, of course, be readily understood that the ease with which cellulose acetate and ethyl cellulose swell or dissolve in suitable media renders them much more amenable to further esterification.

Improvents in Solubility

By utilising very strong soda lye (40 per cent. NaOH) and subsequently maintaining the reaction mixture of soda cellulose (swollen in an organic solvent) and fatty acid chloride at a fairly high temperature (100°) it becomes possible to isolate easily soluble esters. (Brit. Pat. 305,661; Ger. Pat. 515,109.) This method can also be made to yield cellulose esters of cyclic carboxylic acids. Earlier workers in the field of soda cellulose esterification had usually only isolated more or less insoluble products when working with weak soda lye and very low temperatures. As in the case of hydrocellulose, one may assume partial degradation to be responsible for increased solubility. The production of mixed esters by the action of a straight chain carboxylic acid containing more than six carbon atoms on a cellulose ether insoluble in alkali is described in Brit. Pat. 334,897.

A series of esters notable on account of ready solubility in water is described in Brit. Pat. 338,201 and 338,202 of the Eastman Kodak Co., as resulting from the digestion of an acyl ester of cellulose with an alphahydroxycarbolic acid or an alpha- or gamma-ketocarboxylic acid, such as glycerine acid, mandelic acid, alpha-ketocuproic acid and gamma-ketovaleric acid (levulinic acid). It is possible by this method to obtain 25 per cent. aqueous solutions of esters.

A number of methods are available for still further improving the solubility of a given ester of a higher fatty acid. Ger. Pat. 515,107 treats the esters in a liquid medium at a high temperature (but below 200°) with acids or acid anhydrides. As an example, a difficultly soluble cellulose trilaurate was heated in lauric anhydride solution at 190° C. and finally precipitated with alcohol. The resulting product had not suffered any alteration in lauric acid content but exhibited an amazingly low viscosity and increased solubility, a 70 per cent. solution possessing a workable viscosity. The introduction of a halogen into the ester molecule is also found to improve the solubility of cellulose trilaurate (Brit. Pat. 306,132). By heating with phosphorus pentachloride for several hours, a soluble product containing 16.4 per cent. of chlorine could be isolated.

Applications as Resistant Finishing Materials

The distinguishing features of very many of these esters are thermoplasticity and high resistance to water. The first property opens out possibilities in the moulded products industry and the latter characteristic combined with the ready solubility in cheap solvents should give them a future as resistant finishing materials.

British Patent 319,001 describes the use of cellulose naphthenate-oleate as an adhesive suitable for veneer work and plywood. It also mentions the impregnation of paper for textile bobbins with a mixture of the cellulose and starch esters of the commercial fatty acids of coco-nut oil; cellulose trilaurate and cellulose butyrate-ricinoleate have also been suggested in this connection (Ger. Pat. 487,011).

The impregnation of wood as a field of application for higher esters is mentioned in the French Pat. 661,435, the ester either being applied in solution under pressure at the ordinary temperature or at a moderately high temperature such as 100° C. without solvent. Esters containing acids with more than 10 carbon atoms are specially recommended for the manufacture of electrical isolators which do not require the addition of bituminous bodies to impart the necessary high moisture-resistance (Ger. Pat. 519,457). The discovery that insoluble esters become plastic under moderate pressure at low temperature is the basis of French Patent 648,154; under pressure of three atmospheres at 120°. ethyl cellulose laurate can be readily moulded, the original fibrous structure disappearing as a result of this treatment.

Film and Foil Manufacture

The production of an entirely water-resistant material for lining the metallic beds for the manufacture of films and foils involves the use of cellulose esters containing fatty acids with more than 10 carbon atoms, such as cellulose distearate and monoacetate distearate and monomethylcellulose dilaurate (Ger. Pat. 511,978). It is claimed in Brit. Pat. 326,502 that mouldable articles can be obtained from all sorts of cellulosic materials by treatment with an organic acid halide in presence of alkali. Such treatment is obtained by treating one part of pine wood mixed with two parts of pyridine with two and a half parts of palmityl chloride. Modification of this process is described in Brit. Pat. 325,512 whereby the esterified wood substance can be separated into the normal cellulose esters and esterified lignin. It is said that the cellulose esters so obtained have higher viscosity and higher mechanical strength than those prepared from free cellulose.

* I. G. Farbenindustrie Akt.-Ges., unless otherwise stated.

Free Acid in Superphosphate

By C. Krugel and A. Retter

The following article is reprinted from a recent issue of "Superphosphate," which is published by the International Superphosphate Manufacturers' Association, London.

THE manufacture of superphosphate is dependent on a raw material, containing, in addition to tricalcium phosphate, the element of value for superphosphate, a series of secondary components and by-products. At the mines the phosphates are usually freed, as far as it is possible, from clay, carbonate of lime and moisture, by simple preparatory processes such as washing, screening, flotation and drying. Each kind of phosphate represents a definite type in which the quantities of the secondary constituents fluctuate within certain limits. To undertake a further process of purification in the superphosphate factories themselves is prohibitive for economic reasons, superphosphate being a cheap mass-product.

The proportions of sesquioxides (ferric oxide and aluminium oxide) and silicates which remain in the raw phosphate, fundamentally determine the properties of the superphosphate obtained. The manufacturer aims at a product in which the percentage content of water-soluble phosphoric acid is as high as possible and can be retained indefinitely. Monocalcium, however, possesses the property of bringing about a retrogressive reaction, when coming in contact with combinations of ferric oxide and alumina, thereby forming phosphates insoluble in water. This undesirable process can be avoided, if there exists in the finished product a sufficient amount of phosphoric acid, apart from the monophosphate, for the formation of acid phosphates of ferric oxide and alumina. The quantity of sulphuric acid to be added is, therefore, measured in such a way as to produce an end-product, containing from one-fifth to one-fourth of water-soluble phosphoric acid in the form of free acid.

The Expression "Free Acid"

The short expression "free acid" which is often used, induces the reader who may not be fully conversant with the chemical process to think of it in terms of free sulphuric acid, and it so happens that even to-day, after nearly 100 years have elapsed since Liebig recommended the production of the soluble carbonate of lime, such statements are to be found in books on chemical technology and in articles in agricultural periodicals. It goes without saying that such an erroneous conception may cause infinite harm to the good name of superphosphate in quite an unjustifiable manner, because it attributes properties to superphosphate which it does not possess. It seems, therefore, to be a matter of great importance to describe the process as it actually takes place, substantiated by authentic records.

Sulphuric acid, being the strongest acid in free form, cannot, in consequence of this chemical property, exist in the presence of monocalcium phosphate, because sulphuric acid is the stronger agent as compared with phosphoric acid and therefore has the tendency to combine with the lime of the monophosphate as long as the latter exists as such. The monocalciumphosphate contained in ordinary 18 per cent. superphosphate (approximately 20 per cent.) would still be able to combine with 7.7 per cent. free sulphuric acid and form sulphate of calcium. In the manufacture of phosphoric acid for purposes other than fertilisers, the entire amount of lime in the raw phosphate has to combine with sulphuric acid; consequently sulphuric acid is added in surplus quantities and is to be found a such in freeform.

Dissolution of the Superphosphate

The dissolution of the superphosphate takes place in two consecutive phases. At the moment when phosphate is mixed with sulphuric acid, the energy with which the acid combines with lime is very considerable, and, first of all, a portion of the tricalcium phosphate is dissolved in such a degree that phosphoric acid and calcium sulphate is formed. Sulphuric acid in free form disappears already in the course of this reaction. During the second phase the formation of superphosphate commences the phosphoric acid previously formed changing the remainder of tricalcium phosphate into monophosphate. Although Neumann and Kleylein (*Zeit. angew. Chemie*, 1921, page 78) showed in laboratory experiments that in certain circumstances, i.e., in case of a considerable surplus of gypsum, monocalcium phosphate and gypsum can again be converted, such an inversion of reaction evidently never occurs in large technical works, as superphosphate, when extracted by means of alcohol and acetone, shows only traces of free sulphuric acid. Superphosphate does not claim to be a chemical product labelled "purissimum" and even if quantities of 0.1 per cent. of sulphuric acid were found in superphosphate, they could still be regarded as traces. In fact, much smaller quantities are to be found, but usually the findings are next to nil.

Sequence of Analyses

The sequence of analyses followed by the authors in this connection was as follows: 5 grams of superphosphate were shaken up for 15 minutes with 250 cubic centimetres of pure alcohol, the whole filtrate being rendered alkaline with diluted soda-lye and evaporated to dryness by means of a water-bath. The residue was rendered acid by means of hydrochloric acid and precipitated with barium chloride.

In order to control the process the following determinations were carried out: After evaporating 250 cubic centimetres of alcohol and precipitating the same with barium chloride, no precipitate could be traced. Five grams of gypsum $CaSO_4 2H_2O$ were shaken up with 250 cubic centimetres of alcohol to which 0.65 grams of water had been added so as to establish the same conditions as those prevailing in superphosphate containing 13 per cent. of moisture; the evaporated filtrate precipitated with barium chloride resulted in a precipitate of 0.0003 grams of $BaSO_4$ = 0.0001 grams of SO_3.

The quantities of free sulphuric acid determined in the form of SO_3 in various German made superphosphates according to this method and having regard to the variable values were:

2	.....	Traces of SO_3
5	.....	0.01% SO_3
8	.....	0.02% SO_3
1	.....	0.03% SO_3

Eight samples of 16 per cent. superphosphate resulted in the following:—

3	.....	Traces of SO_3
4	.....	0.01% SO_3
1	.....	0.02% SO_3

Two samples of 20 per cent. superphosphate contained 0.01 per cent. SO_3 each. Two samples of 18 per cent. superphosphate manufactured in Denmark contained 0.01 per cent. SO_3 each. Of 21 samples of 16 per cent. and 14 per cent. superphosphate manufactured and tested in France, seven samples, according to information previously published contained 0.01 per cent. SO_3 and 14 samples of 0.02 per cent. SO_3. Other German experimental stations also have recently confirmed that free sulphuric acid cannot be found in commercial superphosphate, apart from traces of no consequence.

As a result of these determinations it is hoped that the erroneous assertions in regard to the existence of free sulphuric acid in superphosphate will disappear from books and periodicals, as these have led to numerous erroneous impressions and have done harm to superphosphate.

Synthesis of Vitamin D

WHAT is claimed to be the first chemical synthesis of a vitamin was described to the American Association for the Advancement of Science in New York last week by Dr. Charles E. Bills and Dr. Francis G. McDonald, who have synthetically produced vitamin D in laboratories at Evansville, Indiana. They obtained the vitamin from ergosterol, but without using light, either in the form of sunshine or of ultra-violet rays. They treated ergosterol with methyl alcohol, ether and ethyl acetate under low temperature with a rigid exclusion of oxygen. The vitamin thus obtained was not as powerful, they said, as that obtained by the use of sunshine or ultra-violet light, but it offered unusual possibilities.

Modern Instruments for the Needs of Chemical Industry

New Developments shown at Joint Exhibition of Physical and Optical Societies

The 22nd annual display of scientific instruments, organised jointly by the Physical Society and Optical Society was held at the Imperial College of Science and Technology, South Kensington, on January 5-7. Some features of the individual exhibits are given below.

As on previous occasions this Exhibition included a trade section, and a research section organised by Fellows of the Societies concerned, the National Physical Laboratory, the Meteorological Office, the Royal Aircraft Establishment, the Davy-Faraday Research Laboratory, the Wool Industries Research Association, the Institute for Research in Agricultural Engineering (Oxford University) and other bodies.

In the research section the Government Laboratory exhibited apparatus for automatically recording residual sulphur in flue gases after scrubbing the gases in purifying chambers. The principle involved in this apparatus is the conversion of the oxides of sulphur into sulphuric acid by means of a dilute hydrogen peroxide solution which has been adjusted to a definite pH. The acid produced changes the pH according to the sulphur content of the gases, and the pH is measured by means of a glass electrode by the change of voltage, which is again converted by an electrometer triode valve into a current suitable for amplifying and passing through a recording galvanometer. The Wool Industries Research Association contributed an apparatus for measuring the air permeability of fabrics, and another for controlling humidity in testing rooms and laboratories. The use of wool as an electrical insulator was shown in wool-insulated wires, which combine high insulating value with non-inflammability.

Laboratory Equipment

Baird and Tatlock (London), Ltd., 14-17 Cross Street, Hatton Garden, London, E.C.1, exhibited an improved model in rapid electrolysis apparatus with self-contained hot plate and universal electric motor; a Cosens pH meter for the determination of hydrogen-ion concentration, using an ordinary thermionic valve; Harrison's hydrogen-ion apparatus, where use is made of a special electrometer valve and glass electrodes; the new Empire balance in an all-metal case, which is very useful in tropical climates, where even the most carefully selected wood cases warp and crack; and a new mercury still provided with an automatic feed so that the still may run for many hours with no attention whatsoever.

The Chamot chemical microscope shown by the Bausch and Lomb Optical Co., Ltd., 67 Hatton Garden, London, E.C.1, had several important improvements including a much larger stage; the addition of a circular revolving nose-piece; a rack and pinion sub-stage; improved attachable mechanical stage; and a greatly improved polarising equipment. Provision has also been made for the insertion of a heating and cooling attachment.

A new type of high temperature electric furnace for ceramics, demonstrating the latest improvements achieved in electric resistors, refractory linings and heat insulation, was shown for the first time by R. M. Catterson-Smith, Adams Bridge Works, Exhibition Grounds, Wembley, Middlesex. It has been usual in the past to equip furnaces of this type with carborundum resistor bars, but a new alloy is now introduced which is of great importance to users of electric furnaces designed for temperatures of above 1,000° C. This alloy has a maximum working temperature of 1,325° C. and offers all the advantages of construction hitherto only possible with nickel chromium resistors, together with an invaluable increase in maximum temperature and improved uniformity of heat distribution. The alloy is incorporated in two refractory side panels, which can be replaced immediately as they slide into the furnace from the front. The furnace temperature is controlled by a built-in regulating resistance of particularly safe design, and the ohmic value is so determined that each furnace gives a large range of control for speed of heating and temperature maintenance.

Vacuum Apparatus

Modern tendencies in vacuum technique to use lower pressures and higher pumping speed were demonstrated by W. Edwards and Co., Allendale Road, Denmark Hill, London, S.E.5. The increased efficiency demanded of vacuum pumps has resulted in many new developments, bringing the number of distinct types of pumps available to more than fifty, each most suitable for its particular purpose. Examples of the most recent types were shown in operation. New patterns in Gaede's vacuum and pressure pumps, giving a displacement of 550 c.c. per second, will now attain a vacuum of 0.002 m.m. and pressures up to 2 atmospheres.

Among the heat economy and control apparatus exhibited by Elliott Bros. (London), Ltd., Century Works, Lewisham, S.E.13, was a new automatic regulator for controlling and maintaining conditions, such as temperature, humidity, pressure, etc., at predetermined values or between defined limits. Here the measuring system is operated electrically and so can be used with any physical condition which can be measured by electrical means, i.e., by pyrometers, electrical thermometers, etc. A chopper bar, operating at adjustable time intervals, causes the indicating pointer to make and break circuits connected to contacts on adjustable limit levers. There was also a new humidity meter giving a direct reading of percentage relative humidity with the necessity of referring to tables or curves. This instrument operates on the wet and dry bulb principle and utilises a second dry bulb electrical thermometer which, in combination with a special measuring bridge and indicator movement, gives automatic compensation for variation of ambient temperature.

At the stand occupied by the Foster Instrument Co., Letchworth, Herts, were shown contact pyrometers incorporating a special design of thermocouple for higher temperatures, say over 350° C., and contact thermometers which consist of a coil of wire with suitable protection, the operation being based on the well-known laws in accordance with which a coil of wire changes its electrical resistance with change in temperature. This patent construction secures the high accuracy of the Wheatstone bridge with the advantages of direct temperature readings, without any preliminary experiment of adjustment.

Electric Furnaces

A. Gallenkamp and Co., Ltd., Technico House, 17-29 Sun Street, and 1-3 Clifton Street, London, E.C.2, had a display of electric furnaces for a maximum temperature of 1,000° C., all types of which can now be fitted with thermostatic control up to a maximum temperature. A muffle furnace was shown with this type of control. Their electric furnace for maximum temperature of 1,350° C. is heated by means of silit rods or tubes; the electrically-heated ovens are thermostatically controlled, for temperatures up to 300° C. and different types are supplied to suit purposes such as drying, softening, impregnating, etc. The Ambler portable gas analysis apparatus, shown for the first time, is a compact portable gas analysis apparatus for flue gases, furnace gases, etc., in addition to laboratory routine analysis. This portable instrument works on samples of 10 ml. or less of gas.

A new design in continuous gas indicators was shown by Griffin and Tatlock, Ltd., Kemble Street, Kingsway, London, W.C.2. It depends upon the comparison of the viscosity-density properties of the gas under test against air in a bridge comprising two capillary tube and orifice plate combinations in parallel with one another—one side taking the gas under test and the other taking air. Indication of composition is by means of a special manometer connected across the chambers immediately in front of the two orifices. Suction is by means of a small motor-driven pump and the arrangement is operated automatically under extremely sensitive and highly stable conditions. This instrument, in its slightly modified forms, has numerous applications, among which may be mentioned the whole field of petrol refining, distribution and storage, the recovery of solvent vapours in numerous industrial processes (acetone, carbon bisulphide, benzene, etc.); all gas scrubbing processes for determining the efficiency of recovery or removal (benzol in illuminating gas and coke oven gas, gasoline in natural gas, etc.); the continuous indi-

cation of inflammable and organic vapours in an atmosphere; leakages from refrigerating plant; unabsorbed gases in chemical processes (e.g., SO_2 in sulphuric acid manufacture, nitrogen oxides in nitric acid manufacture); the composition of gases handled in numerous chemical operations; the humidity of gases, etc.

A large number of new instruments were exhibited by Adam Hilger, Ltd., 24 Rochester Place, Camden Road, London, N.W.1. These included a trichromatic colorimeter of simple construction enabling measurements of colour to be made on solids and liquids to an order of accuracy sufficient for most practical purposes; a photo-electric apparatus for accurately specifying the approach to whiteness of any nearly-white material, the instrument having advantages over visual instruments in that it eliminates the personal factor and affords measurements of a considerably higher accuracy than is possible by visual means; a new design of the already well-known mutochrome specially adapted to the problems of colour designs in textile materials; a commercial adaptation of the spectroscope, so designed that it may be used readily in the works for the rapid identification of alloy steels, and the new Hilger industrial and research spectrophotometer.

Rate of Flow Control

George Kent, Ltd., Biscot Road Works, Luton, exhibited apparatus for measuring and controlling rates of flow of fluids; a temperature controller for use in connection with oil cracking plants; and a new form of combustion efficiency meter which is arranged for panel-mounting. This meter enables very close control to be made of the air supplied to furnaces, with the result that improvements in firing efficiencies are effected.

The chief item of interest to chemical industry at the stand occupied by Negretti and Zambra, 38 Holborn Viaduct, London, E.C.1, was a direct-reading wet and dry bulb hygrometer designed to enable the percentage relative humidity to be readily determined. The dry bulb thermometer has its stem arranged horizontally, whilst the wet bulb thermometer is mounted vertically on a frame which, by means of a screw thread, is made to traverse the instrument frame in a horizontal direction until an index coincides with the reading of the dry bulb thermometer. The divided portion of the vertically arranged wet bulb thermometer passes behind a glass plate, on which a chart is etched, from which the relative humidity is read off directly at the point of the reading of the wet bulb thermometer.

L. Oertling, Ltd., 65 Holborn Viaduct, London, E.C.1, were showing their balance No. 49, with 8½ in. gunmetal beam to carry 200 grammes in each pan and sensitive to 2 m/grms. This is a new design in balances and eliminates the use of all fractional weights, being provided with a rider-weight of the value of 5 decigrams placed on a rod fitted above the beam in such a manner that it cannot be readily removed therefrom without disassembling parts of the beam.

Vitreosil pure fused quartzware exhibited by The Thermal Syndicate, Ltd., Vitreosil Works, Wallsend-on-Tyne, included mercury vapour burners for research and industrial work; low pressure mercury arc tubes with translucent envelope; a water-operated gas ejector pump and air lift pump, and water distillation apparatus with continuous feed.

Various models of the Lovibond tintometer, suitable for technical and commercial purposes, were shown by the Tintometer, Ltd., The Colour Laboratory, 1 The Friary, Salisbury. The Lovibond tintometer (British Drug Houses pattern) particularly suitable for biochemical laboratories was another feature at this stand.

Trade with South America

THE 1932 edition of *The South American Handbook* (Trade and Travel Publications, Ltd., price 2s. 6d.) now in its ninth year of issue, is the only annual dealing with Latin-America. It appears at a time when interest in the Republics has been increased by the recent visit of the Prince of Wales and by the success of the exhibition at Buenos Aires. This handbook gives the trader a maximum of essential information in the most concise form. It deals individually with all countries southwards from Mexico to Tierra del Fuego, giving details about the main towns, constitution and government, agricultural and forest produce, mineral resources, currency, imports and exports, transport and consular representation.

Chemical Trade in India

Statistics for Recent Imports

A SURVEY of the import trade of India, during the six months ended September 30, 1931, prepared by H.M. Senior Trade Commissioner in India, has just been issued by the Department of Overseas Trade (Ref. No. C.3765). Discussing the general features of the situation, this Report points out that during the six months ended September, 1931, the value of the imports decreased, as compared with the corresponding period of 1930, by Rs.21 crores, or 24 per cent., and amounted to Rs.66 crores, and the total exports, including re-exports, fell by Rs.47 crores, or 38 per cent., to Rs.78 crores. The exports of Indian merchandise showed a decrease of Rs.47 crores, or 38 per cent., and re-exports also decreased by Rs.2 lakhs, or 0.8 per cent. The grand total of imports, exports and re-exports amounted to Rs.144 crores, as against Rs.213 crores, a decrease of Rs.69 crores, or 32 per cent. (Rs. one crore = Rs.100 lakhs = £750,000).

Notable Decrease in Acids

In view of the severe depression which has pervaded this market it is remarkable that the total imports of chemicals only fell from Rs.134¾ lakhs to Rs.133½ lakhs. Details of the countries of origin are not yet available, but the total imports under each heading were as follows:—

	1930. Rs. (lakhs).	1931. Rs. (lakhs).
Acids	6	3½
Bleaching powder	4	4½
Carbide of Calcium	5	4¼
Copper Sulphate	1½	1¾
Disinfectants	5	4¼
Glycerine	1¾	1¾
Potassium Chlorate	4	2½
Sodium Bicarbonate	3¾	4½
Sodium Carbonate	33½	36
Sodium Cyanide	2	2
Sodium Silicate	2	1¼
Sulphur (Brimstone)	8½	8¾

The total trade in drugs and medicines advanced slightly from Rs.82½ to Rs.88 lakhs, the following being the principal items:—

	1930. Rs. (lakhs).	1931. Rs. (lakhs).
Camphor	11	12
Proprietary and patent medicines	17	19½
Quinine salts	9¾	12
Saccharine	½	1¼

Details of the countries of origin are not yet available.

Competition in Dyestuffs

The total imports of alizarine fell from 1,832,157 lb. valued at Rs.9¼ lakhs to 1,224,334 lb. valued at Rs.5¾ lakhs. Imports from Germany dropped from 1,442,621 lb. (Rs.7¼ lakhs) to 953,172 lb. (Rs.4½ lakhs). British shipments rose from 267,344 lb. (Rs.1¼ lakhs) to 271,162 lb. (Rs.1.4 lakhs).

The total imports of aniline also fell from 7,247,445 lb. valued at Rs.101 lakhs to 5,737,655 lb. valued at Rs.98¾ lakhs. German shipments fell in quantity from 5,262,478 lb. to 4,342,618 lb. but rose in value from Rs.72 lakhs to Rs.75½ lakhs. Shipments from the United Kingdom, however, were reduced from 469,042 lb (Rs.6¼ lakhs) to 401,287 lb. (Rs.5 lakhs), and those from the U.S.A. from 797,723 lb. (Rs.9 lakhs) to 487,652 lb. (Rs.6 lakhs). Swiss imports fell from 228,442 lb. (Rs.7 lakhs) to 191,799 lb. (Rs.6½ lakhs), and Italian from 413,956 lb. (Rs. 4¾ lakhs) to 228,919 lb. (Rs.3¼ lakhs).

The total trade in paints and colours fell from Rs.42¾ lakhs to Rs.33 lakhs. United Kingdom shipments dropped from Rs.27¾ lakhs to Rs.20¼ lakhs, U.S.A. from 2¾ lakhs to Rs.1½ lakhs and German from Rs.5 lakhs to Rs.4½ lakhs. Imports from Japan rose from Rs.1 lakh to Rs.1¾ lakhs.

The total imports of soap fell from 176,239 cwt. valued at Rs.61 lakhs to 174,191 cwt. valued at Rs.51.3 lakhs. The United Kingdom share dropped from 158,503 cwt. (Rs.54 lakhs) to 146,225 cwt. (Rs.43 lakhs) while that of "other countries" rose from 17,736 cwt. (Rs.7 lakhs) to 27,966 cwt. (Rs.8½ lakhs). The imports of soap included household and laundry soap, 149,835 cwt. (Rs.34 lakhs); toilet soap, 17,109 cwt. (Rs.15 lakhs); others sorts, 7,247 cwt. (Rs.2¼ lakhs).

Hydrogenation of Fatty Acid Esters

To the Editor of THE CHEMICAL AGE.

SIR,—In your issue of October 31 (page 381) you published a résumé of details given to the Association of German Chemists' meeting in Vienna by Dr. W. Normann. From this résumé it would appear as if Dr. Normann was the pioneer on this subject and had been the first to produce fatty alcohols by this process on a large scale, but this is misleading.

The detailed research work on the subject leading to industrial mass-production of these materials was performed several years previously by the Deutsche Hydrierwerke A.G., Berlin-Charlottenburg (for whom we are the sole concessionaires for Great Britain and Dominions), under the direction of Professor Dr. Schrauth. In *Zeit. für Angew. Chemie*, November 21, page 922, there appears a letter from the Deutsche Hydrierwerke on this subject which speaks for itself.—Yours etc.,

RONSHEIM AND MOORE.

11A Wormwood Street, London, E.C.2.

An Appeal for British Chemical Plant

To the Editor of THE CHEMICAL AGE.

SIR,—May I make an appeal through your columns to all purchasers of chemical plant in this country to "Buy British" and support the "Buy British" campaign recently inaugurated by H.M. Government. The serious economic condition of this country with its heavy adverse trade balance and grievous burden of unemployment can be much ameliorated by restricting purchases abroad to those commodities which cannot be obtained here. To "Buy British" when British industry can supply the goods required, will produce results which recoil on the country as a whole, as the present situation has clearly proved. In the case of chemical plant, the British industry has proved its ability to provide the most up-to-date apparatus and machinery at reasonable prices, so that, speaking generally, there is little, if any, need for users of such plant to go abroad for their requirements. If there were any doubts on this point they should have been dispelled by the British Chemical Plant Exhibition held in the Central Hall, Westminster, last July. Nevertheless, cases still occur in which contracts are placed abroad for plant which the British industry can quite well supply, and do so at prices which compare favourably with the foreign. What makes the position worse is that British makers are often not given an opportunity to quote. If this occurs owing to lack of knowledge as to British makers, may I offer the services of the British Chemical Plant Manufacturers' Association to all who may be in difficulties. The Association deals regularly with numerous inquiries of such a nature, and while it directs them, in the first instance, to its members, it does not fail to draw attention to the capabilities of outside British firms should members be unable to supply the article in question.

Will all chemical manufacturers, therefore, co-operate with the British Chemical Plant Manufacturers' Association in "Buying British," so that British chemicals may be made with British plant.—Yours etc.,

J. DAVIDSON PRATT, Secretary,
British Chemical Plant Manufacturers' Association.

The Friends of Economy

THE great economy movement initiated by the Friends of Economy a little less than a year ago is reviewed in the first annual report of the movement, just issued. In view of the results of the General Election, the Friends of Economy feel justified in the action they took, and are encouraged to push forward the continuation and extension of the campaign. Following the city economy demonstration in January last, fifty provincial demonstrations were held within the ensuing six months, and even since the election in October interest in the work has been well maintained.

Eleven national organisations have definitely associated themselves with the Friends of Economy, and a national committee has been formed for the production and dissemination of suitable literature and other general propaganda in the interests of economy.

I.C.I. Sandbach Works to Close

IT has been decided to close down permanently the Sandbach Alkali Works of Imperial Chemical Industries, Ltd. Production will cease at the end of February, and the dismantling, which it is expected will give employment to a considerable number of men for some months, will probably be begun about the middle of March. Almost simultaneously with the closing of the Sandbach works, the Middlewich works of the company, which have been closed since August last (during which time a partial reconstruction scheme has been completed) will be re-opened. These works are of greater capacity and more efficient than the Sandbach works, which do not lend themselves to expansion, and the working of small units is now uneconomic.

Upwards of 250 men will be affected by this decision to close Sandbach works, but some of the men will be transferred to other I.C.I. works in Cheshire. Sandbach Council, however, have forwarded a letter and resolution to I.C.I. Headquarters in London, asking them to continue the Works for a period of six months, in order to enable the Council to obtain other industries for the town.

Fertilisers Graded on Nitrogen Content

New Practice adopted in the United States

AN important change in regulations for labelling fertilisers affecting farmers in many parts of the United States became effective on January 1, from when it became necessary to use "nitrogen content" in place of "ammonia content" as the basis for labelling. According to Dr. Oswald Schreiner, chief of the division of soil fertility, Bureau of Chemistry and Soils, U.S. Department of Agriculture, who represented the department in a series of conferences between State control officials, agronomists and fertiliser manufacturers, this change is desirable from most points of view. He points out that nitrogen in the ammonia form is present in only a few of the fertiliser materials which are commonly used, although nitrogen is present in several different forms in such fertiliser materials as sulphate of ammonia, nitrate of soda, calcium cyanamid, calcium nitrate, potassium nitrate, ammonium phosphate, tankage, fish meal, cottonseed meal and other animal and plant by-products. It is thus desirable that the name of the element nitrogen and not the equivalent in one of the particular forms in which it occurs, should appear on fertiliser labels. The fact that 1 per cent. of nitrogen is the equivalent of 1.22 per cent of ammonia has also led to some confusion because of the indiscriminate use of the two terms as applied to fertiliser content.

For several years agronomists of various States have recommended the standardisation of fertiliser mixtures. In revising their formulas many manufacturers are changing the mixtures so that the new fertilisers will contain the same numerical percentage of nitrogen as the old did of ammonia. This will mean that if the new fertiliser analysis reads the same as the old, the new one will contain about one-fourth more nitrogen. The new regulations will require that the percentages of plant food be stated in whole numbers and not in fractions for all mixed fertilisers. There will be printed on the bag a simplified statement of the guarantee showing only the net weight and brand name including the analysis, guaranteed percentage of nitrogen, of available phosphoric acid, and of potash, and the name and address of the manufacturer.

Improved Laboratory Rectifying Stills.

THE November issue of the Bureau of Standards *Journal of Research* contains a complete description of a set of all-glass rectifying stills, suitable for distillation at pressures ranging from atmospheric down to about 50 mm. The stills are provided with efficient bubbling-cap columns containing 30 to 60 plates. Adiabatic conditions around the column are maintained by surrounding it with a jacket provided with a series of independent electrical heating units. Suitable means are provided for adjusting or maintaining the reflux ratio at the top of the column. For the purpose of conveniently obtaining an accurate value of the true boiling points of the distillates a continuous boiling-point apparatus is incorporated in the receiving system. An efficient still of the packed-column type for distillations under pressures less than 50 mm. is also described.

From Week to Week

A GLASGOW CONCERN is stated to be interested in a proposal to revive the kelp industry in Scotland.

SIR JOHN STIRLING MAXWELL, BT., has been elected president of the British Wood Preserving Association in succession to Sir Harold Boulton, Bt.

BAKELITE, LTD., have just commenced production in a new factory on a 30-acre site at Tyseley, Birmingham, and are already finding the accommodation heavily taxed. The factory is working day and night, and it is anticipated that additional hands will be employed; there is also the possibility that further extensions will have to be made.

DESPITE CRITICISM by several shareholders, one of whom suggested that it would be better to wind up the company, the report of the Branston Artificial Silk Co., Ltd., was adopted by thirty-five votes to thirteen at the company meeting on December 31. The chairman, Mr. M. C. Harman, said that in order to get rid of the receiver, £75,000, 6½ per cent. debentures would be offered on January 31.

THE NEW YEAR'S HONOURS LIST contains the name of Miss Harriette Chick, D.Sc., upon whom the C.B.E. has been conferred for services to the Medical Research Council in connection with research on vitamins and the science of nutrition. Mr. Harold Moore, D.Sc., F.I.C., director of metallurgical research to the War Office, has been raised from O.B.E. to C.B.E. Dr. Norman Lindsay Sheldon, Ph.D., F.I.C., was among the Companions of the Order of the Indian Empire.

TWO SPECIAL LECTURES dealing with some recent advances in the chemistry of the fats will be given at Chelsea polytechnic, on successive Thursday evenings, at 6 p.m., commencing January 28. The lecturer will be Dr. Colin H. Lea, Ph.D., of the Low Temperature Station, Cambridge. The fee for the series is 2s. 6d. The first lecture will deal with the fatty acid and glyceride structure of the natural vegetable and animal fats; in the second lecture rancidity and changes taking place in edible fats during storage will be considered.

A NEW BLAST FURNACE is now undergoing tests at Workington which may revolutionise the West Coast hematite pig iron trade, and incidentally reduce labour costs very considerably. The filling of an ordinary furnace takes 20 men per shift, but one man only is needed to do the work of this new blast furnace. While embodying the latest improvements in blast furnace practice, its operations are electrically controlled. The mere pressing of a button automatically operates the charger, lifts and lowers bells and empties the skips. In proper working order, its output will be about 400 tons weekly against the 250 tons for the ordinary furnace.

REPLYING TO THE INQUIRY of the League of Nations respecting the Soviet Government's intention in the matter of signing the International Narcotics Convention, M. Litvinov, the Foreign Commissar at Moscow, stated that the U.S.S.R. does not intend to make use of its right to sign the Convention, believing it to be, like previous narcotics agreements, inadequate for checking the abuse of and the contraband trade in these articles. M. Litvinov adds that the U.S.S.R. will continue to carry on a strenuous and indefatigable struggle against the abuse of narcotics and the smuggling of opium and its derivatives, making use of its own legislation for this purpose.

THE TENTH ANNUAL CORPORATION MEETING of the Institution of Chemical Engineers will be held at the Hotel Victoria, Northumberland Avenue, London, W.C.2, on Friday, February 19. The usual formal business will be transacted, after which the President, Mr. W. A. S. Calder, will deliver his address, the subject being "Control of Industry." In the afternoon a paper on "Thermal Insulation" will be presented by Dr. Ezer Griffiths, F.R.S., of the National Physical Laboratory, who is well known as an authority on this subject. The annual dinner of the Institution will be held at the Hotel Victoria in the evening, when the principal speaker will be Sir Harry McGowan, chairman of Imperial Chemical Industries, Ltd.

MR. JAMES HAMILTON, vice-chairman of the Anglo-American Oil Co., is retiring.

DR. L. S. BAGSTER has been appointed to the Chair of Chemistry at the University of Queensland rendered vacant by the retirement of Professor Steele.

MR. H. MARTIN, who for the past fifteen years has been chemical buyer to the British Drug Houses, Ltd., has relinquished that position on being appointed to represent the firm throughout the country for fine chemicals.

FOLLOWING THE ARRANGEMENT for the voluntary curtailment of copper production recently announced by the Copper Institute, the Phelps Dodge Corporation is to reduce its copper production immediately to 8,500,000 lb. monthly, as compared with its previous output of 17,500,000 lb.

CONTRACTS to the extent of several thousand pounds have been arranged on behalf of Scottish Agricultural Industries, Ltd., for the erection of a new factory for the manufacture of cattle-feeding cubes and meals on Commercial Quay, Aberdeen.

REDLER PATENTS whose works are at Sharpness, Gloucestershire, announce a reduction in prices. The reasons given for the change are that their system of modern bulk conveying is now spreading so rapidly and widely that the firm wishes its clients to share in the lowered costs of production resulting from this state of things.

A MEETING OF THE UNSECURED CREDITORS of Atlas Artificial Silk Processes, Ltd., will be held in Manchester on January 13, at 3 p.m., to consider and, if thought fit, to approve, a scheme of arrangement proposed to be made between the company and Alliance Artificial Silk, Ltd. A compulsory order for the winding-up of the Atlas Company was made in June last. Petitions for the winding-up of the Alliance Company have been presented, and adjourned from time to time.

THE SECRETARY FOR MINES announces that an Order has been made in pursuance of Section 61 of the Coal Mines Act, 1911, adding to the list of "permitted explosives" to be used in certain classes of mines the following explosives:—(a) Fortex, manufactured by Explosives and Chemical Products, Ltd.: (b) Nitro-baelenite No. 3, manufactured by Poudreries Reunies de Belgique S.A. The Order also removes from the permitted list certain explosives which are no longer manufactured or used.

A REPRESENTATION has been made to the Board of Trade under Section 10 (5) of the Finance Act, 1026, for the exemption from safeguarding duties of barium silicofluoride, on the ground that Dominion supplies are not adequate for the consumption in the United Kingdom. Any communications on the subject should be addressed to the Principal Assistant Secretary, Industries and Manufactures Department, Board of Trade, Great George Street, London, S.W.1, before February 4.

THE SOCIETY OF GLASS TECHNOLOGY has invited the Ceramic Society to visit its headquarters at Sheffield, in February. Amongst other things, arrangements will be made for members to visit some of the glass works in the neighbourhood, this being a unique opportunity for members to see a cognate industry, as potters will get many useful hints in the working of frits, which are closely related with glasses. The members of the Refractory Materials Section will see refractories being employed under severe conditions, and members of the Building Materials Section will see window glass in course of manufacture.

RECENT WILLS include:—Mr. Herbert William Robinson, of Mawley, Cleobury, Mortimer, Shropshire, £49,176. Mr. Robinson was chairman of Robinson Brothers, Ltd., Birmingham, and was a pioneer in the use of coal tar for road purposes, being a director, and in many cases chairman, of nearly a dozen companies operating in that industry. Mr. Thomas Reade, of 57 Tettenhall Road, Wolverhampton, Staffs, chairman of Reade Bros. and Co., Ltd., manufacturing chemists, Wolverhampton, £20,412 (net personalty £19,411). Mr. Philip Holland, one of the first Fellows of the Institute of Chemistry, £37,010 (net personalty £35,417).

Patent Literature

The following information is prepared from published Patent Specifications and from the Illustrated Official Journal (Patents) by permission of the Controller to H.M. Stationery Office. Printed copies of full Patent Specifications accepted may be obtained from the Patent Office, 25, Southampton Buildings, London, W.C.2, at 1s. each.

Abstracts of Accepted Specifications

355,783. DYES. Chemische Fabrik. vorm. Sandoz, Basle, Switzerland. International Convention date, March 30, 1929.

Dinitro-stilbene-disulphonic acid is condensed with one or two molecules of aminoaryl-benzothiazole-sulphonic acids and the products oxidised to obtain dyes giving bright yellow to orange shades fast to alkali on cotton. Suitable aminoaryl-benzothiazole-sulphonic acids include the sulphonic acids of dehydrothiotoluidine, dehydrothioxylidine and dehydrothiocumidine, primuline and xylidine-primuline. Examples are given.

355,800. DYES. Soc. of Chemical Industry in Basle, Basle, Switzerland. International Convention date, May 28, 1929. Addition to 343,014 (see THE CHEMICAL AGE, Vol. xxiv, p. 471).

Azo dyestuffs containing metals are obtained by treating *o*-oxyazo dyestuffs free from sulphonic, carboxylic, sulphonamide, or N-substituted sulphonamide groups with a suspension of oxide, hydroxide, carbonate, or sulphide of copper, cobalt, nickel, manganese, iron, aluminium or zinc, with or without an organic salt or an alkaline, neutral or acid, inorganic salt. The products are suitable for colouring varnishes containing cellulose esters, or ethers, or natural or artificial resins.

355,808. DYE INTERMEDIATES. Imperial Chemical Industries, Ltd., Millbank, London, and C. H. Lumsden, Crumpsall Vale Chemical Works, Blackley, Manchester. Application date, May 29, 1930.

2-Mercapto-arylene-thiozoles are treated with aqueous caustic soda at an increased temperature and pressure to obtain *o*-amino-thiophenols. The solution may be treated with chlor-acetic acid to obtain *o*-amino-aryl-thioglycollic acids. Some examples are given.

355,810. DYES. W. W. Groves. From I. G. Farbenindustrie Akt.-Ges., Frankfort-on-Main, Germany. Application date, May 29, 1930.

1-Amino-4-halogen-anthraquinone-2-sulphonic acids are condensed with aromatic amino-mono- or polycarboxylic acids, and the products converted into their carboxylic acid esters; or these amino-anthraquinone derivatives are condensed with the esters of aromatic amino-mono- or poly-carboxylic acids; or one of these esters is condensed with a 1-amino-2: 4-dihalogen anthraquinone and the product converted to the 2-sulphonic acid by alkali sulphite. The products are acid wool dyes, and several examples are given.

355,832. SULPHUR. A. M. Clark, Norton Hall, The Green, Norton-on-Tees, Durham, and Imperial Chemical Industries, Ltd., Millbank, London. Application date, May 31, 1930.

Gases containing sulphur obtained from the reduction of sulphur dioxide by coke at a high temperature are subjected to slow cooling at temperatures between 100° C. and the condensation temperature, so that the size of the condensation particles is increased and separation by condensation is possible. The cooling is effected in stages by passing the gas through a series of vessels maintained at temperatures within the range, or by passing it through a chamber lagged to maintain the desired temperature range. Larger condensation particles are obtained by regulating the amount of dust in the gases.

355,955. PHOSPHORIC ACID, CALCIUM CYANAMIDE AND NITROGEN. H. Wade, London. From International Agricultural Corporation, 61 Broadway, New York. Application date, September 1, 1930.

Phosphate rock is reduced with coke in an electric furnace, and the volatilised phosphorus is condensed and oxidised with air to obtain phosphoric anhydride and nitrogen. The calcium carbide residue is treated with the nitrogen to obtain calcium cyanamide, and the excess of nitrogen is used for making nitrogenous products. The phosphoric anhydride may be converted into ortho-phosphoric acid.

355,861. CATALYTIC PRODUCTION OF HYDROGEN. Oesterreichisch Amerikanische Magnesit Akt.-Ges., Radenthein Carinthia, Austria. International Convention date, June 18, 1929.

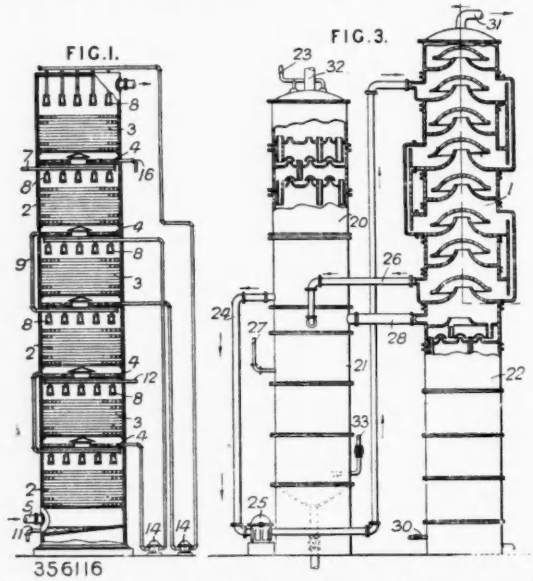
Water gas is treated to remove carbon monoxide by mixing with steam and passing over a contact mass containing carbon and magnesium oxide, hydroxide or carbonate, at about 500° C.

356,038. PHOSPHORUS AND PHOSPHORUS-OXYGEN COMPOUNDS. Metallges. Akt.-Ges., 45 Bockenheimer Anlage, Frankfort-on-Main, Germany. International Convention date, November 29, 1929. Addition to 347,937 (see THE CHEMICAL AGE, Vol. xxv, p. 154).

In the production of phosphorus or phosphorus-oxygen compounds from sintered raw phosphate, better sinters are obtained by adding over 2 per cent. of alumina. In an example, a mixture of Morroco phosphate, loam, kaolin, ground felspar or bauxite, coke dust and silica is sintered and then irrigated with a mixture of coke dust and water.

356,116. DISTILLING AMMONIACAL LIQUOR. Koppers Co., Koppers Building, Pittsburg, Pa., U.S.A. Assignees of M. Shoeld 257 Le Moyne Avenue, Pittsburg, Pa., U.S.A. International Convention date, August 17, 1929.

Ammoniacal liquor is sprayed through pipe 7, on to the uppermost tray 2 of the column, and passes downwards through the lower trays, which are separated by partitions 4, which permit the upward flow of gas but prevent the downward flow of liquid. Liquid passes from the partition 4, by pipe 9, to a lower series of trays. Steam is introduced at 5, and passes upwards through the column to remove the phenol, which is then absorbed by caustic soda solution in alternate trays 3. The soda is supplied by pipe 12, to the lowest section 3, and is then transferred to the next section 3, by pump 14, and so on to the top section 3, and outlet 16. In another apparatus, the liquor is supplied to the top of a column 20,



where free ammonia, carbon dioxide, and hydrogen sulphide are liberated and drawn off through pipe 32. The liquor passes off by pipe 24, to pump 25, and thence to the top of a column 1, operating on the same principle as Figure 1, for the removal of phenol. The liquor then passes through pipe 26, into a vessel 21, a suspension of lime is added through pipe 26, into a vessel 21, a suspension of lime is added through pipe 27, and the liquor mixed by steam introduced by pipe 33. The mixture passes by pipe 28 to a column 22, in which fixed ammonia is removed by means of steam which afterwards

passes through the column 1, and then to the lower end of column 20. Modifications are described in which the positions of the vessel 21 and column 22 are interchanged, and also in which the column 1, forms a separate unit.

356,189. CATALYTIC DEHYDROGENATION. J. Y. Johnson, London. From I. G. Farbenindustrie Akt.-Ges., Frankfort-on-Main, Germany. Application date, May 2, 1930.

Aromatic hydrocarbons in which any aliphatic side chain present contains only one carbon atom are condensed with themselves by treating the vapour at 500°-800° C. with difficulty fusible metal oxides or compounds which yield such oxides. The catalysts may be mounted on carriers and may be pretreated with ethylene or benzene hydrocarbons at 700°C. to form a coating of lustrous or crystalline carbon. Suitable catalysts include oxides or calcium, barium, strontium, magnesium, titanium, cerium, zirconium, thorium, tungsten, molybdenum, manganese, chromium, uranium, aluminium, vanadium and beryllium. Also vanadates, chromates, tungstates, molydates, aluminates, and zincates. In an example, benzene vapour is passed over magnesium oxide which has been treated with ethylene, to obtain diphenyl with some diphenyl-benzene. In another example, naphthalene vapour and steam are passed over a mixture of tungstic and aluminium oxides which have been treated with benzene vapour, to obtain a product which contains $\alpha : \alpha^1$- and $\beta : \beta^1$-dinaphthyl.

356,190. HYDROCYANIC ACID. Ges. fur Kohlentechnik, 26 Deutschestrasse, Eving, Dortmund, Germany. International Convention date, June 6, 1929.

Nitric acid and then ammonium sulphur cyanide solution are added to a solution of ammonium bisulphate at 95°-97° C. so that the solution always contains 1 per cent. of free nitric acid. The vapours are condensed to remove nitric acid, hydrocyanic acid being absorbed in alkali, and nitric oxide is converted into nitric acid.

356,205. PARAFFIN WAX. J. Y. Johnson, London. I. G. Farbenindustrie Akt.-Ges., Frankfort-on-Main, Germany. Application date, June 4, 1930. Addition to 291,817.

Mixtures containing paraffin wax and other carbonaceous materials are treated with formates of the lower alcohols containing a small proportion (2-20 per cent.) of solvents such as benzine, benzene, toluene, xylene, pyridine, trichlorethylene, carbon disulphide, and carbon tetrachloride. In an example brown coal low temperature tar freed from pitch is treated with methyl formate, benzene, and methanol, and the solvent removed by filtration. A yield of 20 per cent. of white paraffin wax is obtained.

356,166. WETTING AGENTS. A. Carpmael, London. From I. G. Farbenindustrie Akt.-Ges., Frankfort-on-Main, Germany. Application date, June 2, 1930.

A neutralised sulphonation product of an unsaturated or hydroxy fatty acid is esterified with a monohydric alcohol in the presence of an acid or acid salt. Examples are given.

356,192. COMPLEX SALTS OF PHENOLS. A. Carpmael, London. From I. G. Farbenindustrie Akt.-Ges., Frankfort-on-Main, Germany. Application date, May 27, 1930.

These salts are obtained by treating solutions of organic compounds containing phenolic hydroxyl groups and negatively substituted in the phenolic nucleus by one or more groups none of which is more acid than the phenolic group, with ammoniacal solutions of metal salts. Thus, compounds such as 2 : 3 : 5-trichlor-4-hydroxy-1-methylbenzene, 2 : 4-dinitrophenol, 2-chlor-4-nitrophenol, 2 : 4-dichlorphenol, are treated with copper-ammonium sulphate, or ammoniacal copper acetate or zinc acetate. The products are employed as insecticides or preservatives.

356,218. WETTING AGENTS. A. Carpmael, London. From I. G. Farbenindustrie Akt.-Ges., Frankfort-on-Main, Germany. Application date, June 4, 1930.

An alkyl- or aralkyl-sulphonic acid or a salt containing a labile halogen atom in the side chain is treated with a higher aliphatic amine containing more than 8 carbon atoms, or an aralkyl halide is treated with a higher aliphatic amine and sulphonated. The products may be alkylated or aralkylated until their aqueous solutions are stable to weak organic acids. In an example, β-chlorethane-sulphonic acid is condensed with hepta- or pentadecylamine, and the product may be alkylated with dimethylsulphate.

356,408. TREATING SOLUTIONS OF POLYVINYL ALCOHOLS. I. G. Farbenindustrie Akt.-Ges., Frankfort-on-Main, Germany. International Convention date, July 29, 1929.

Aqueous solutions of polyvinyl alcohols are treated with an aldehyde in the presence of lactic acid, phosphoric acid or hydrochloric acid, and under such mild conditions that products insoluble in water are not formed. The catalyst is then neutralised and any excess of aldehyde eliminated by adding ammonia A number of examples are given of the production of viscous solutions for making emulsions of insoluble dyes, or for sizing, dressing or printing.

356,508. LAKES. J. Y. Johnson, London. From I. G. Farbenindustrie Akt.-Ges., Frankfort-on-Main, Germany. Application date, September 29, 1930.

Solutions of leuco compounds of basic dyestuffs of the triarylmethane series, which may contain acid groups, are precipitated with solutions of complex inorganic acids in the absence of oxidising agents, and the colour lakes of the leuco compounds obtained are then oxidised to the colour lakes of the dyestuffs, with hydrogen peroxide, arsenic acid, ferric hydrate, chloranil, lead dioxide, potassium permanganate or sodium bichromate. Dispersing agents such as salts of alkylated naphthalene sulphonic acids may also be added. In an example, the leuco compound of Methyl Green is precipitated with a hydrochloric acid solution of sodium phosphotungstic molybdate and the product oxidised with potassium permanganate.

356,550. SUBSTITUTED MALONIC ESTERS. Laboratoire Français de Chimiotherapic and A. Girard, 89 Rue du Cherche, Midi, Paris. Application date, October 24, 1930.

A malonic acid ester substituted by a branched radical having at least seven atoms of carbon is treated with a basic bismuth salt, such as the nitrate, dissolved by means of a polyhydroxylic compound such as mannitol. Examples are given in which dipropyl-carbinyl-malonic ester and octyl-malonic ester are used. The products are complex fat-soluble basic bismuth salts.

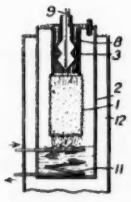
356,600. PURIFYING LACTIC ACID. R. von Wülfing, and E. Möller, 231 Friedrichstrasse, Berlin, and H. Umber, 8 Schwäbischestrasse, Berlin. Application date, December 10, 1930.

Lactic acid obtained by fermentation is treated with a solvent in which lactic acid is insoluble, such as carbon disulphide, or chlorinated derivatives of methane and ethane. The solvent is then treated with lime to remove the insoluble salts of butyric acid, caproic acid and other higher fatty acids.

356,606. ALCOHOLS. H. T. Böhme Akt.-Ges., 29 Moritzstrasse, Chemnitz, Germany. International Convention date, January 27, 1930.

Higher aliphatic alcohols containing six or more carbon atoms are obtained by reducing esters of the corresponding acids by hydrogen at 100-200 atmospheres at 300°-400° C. in the presence of a catalyst of finely divided copper on kieselguhr. In an example, the ethyl ester of lauric acid or the mixture obtained by esterifying the mixed fatty acids from coconut oil, is reduced at 350° C. to obtain lauryl alcohol. The products are readily sulphonated.

356,239. LIQUID FUEL. Koppers Co., Koppers Building, Pittsburg, Pa., U.S.A. Assignees of H. J. Rose, Penn., Pa., U.S.A., and W. H. Hill, 94 Eckardtstrasse, Wittenannen, Westphalia, Germany. International Convention date, June 1, 1929.



356,239

Coal is placed in a wire basket 1, of fine mesh, supported in an oil container 2, by a cylinder 3 containing a cooler 8 supplied with water by a pipe 9. A solvent for the coal is heated to boiling by a coil 11 and heating jacket 12, and the vapour passes through the coal and condenses on the surface 8, and then returns to the coal. The basket 1, may be coated with infusorial earth or sand to prevent the passage of insoluble material. The solid insoluble contents of the coal will also form a filter layer on the basket. The solvent may be coal tar oil, anthracene oil, etc.

356,238. HALOGEN AND OXYHALOGEN COMPOUNDS OF PHOSPHORUS. Naamlooze Vennootschap Electrochemische Industries, 20 Molenweg, Roermond, Holland. International Convention date, May 30, 1929.

A mixture of an oxygenated phosphorus compound and carbon is treated with halogen in the presence of a solvent or dispersing agent for the reacting material, such as molten zinc chloride, cupric chloride or ferric chloride, or sodium carbonate, at a temperature of 500°-600° C. Phosphorus chlorine compounds and carbon monoxide distil over. The process is applicable to the production of other halogen compounds from the corresponding oxygen compounds.

356,580. AMMONIUM SULPHATE. F. A. F. Pallemaerts, 100 Avenue de la Toison d'Or, and Union Chimique Belge Soc. Anon, 61 Avenue Louise, Brussels. Application date, November 27, 1930.

Ammonium sulphate is produced by treating calcium sulphate with ammonium carbonate solution in a continuous wet-grinding mill, and the mixture is directly filtered at the outlet by continuous vacuum filters. Any ammonia may be distilled off and neutralised, and the neutral solution evaporated in multiple effect evaporators.

Specifications Accepted with Date of Application

363,344. Hydrocarbons, Manufacture and production of. J. Y. Johnson. (*I. G. Farbenindustrie Akt.-Ges.*). June 6, 1930.

363,347. Calcium sulphate, Preparation of. S. F. W. Crundall, I. P. Llewellyn, and P. Spence & Sons, Ltd. July 12, 1930.

363,360. Conversion of distillates obtained from coal, oil, shale, etc., into products of lower boiling point. A. G. L. Try and M. Stuart. September 11, 1930.

363,362. Chrome yellow colouring matters, Manufacture of. J. Y. Johnson. (*I. G. Farbenindustrie Akt.-Ges.*). September 15, 1930.

363,375. Acetylene, Manufacture of. J. Y. Johnson. (*I. G. Farbenindustrie Akt.-Ges.*). August 5, 1930.

363,392. Acridine derivatives, Manufacture of. A. Carpmael. (*I. G. Farbenindustrie Akt.-Ges.*). June 18, 1930.

363,404. Obtaining pure copper by electrolysis, Method of. Hirsch Kupfer-und Messingwerke Akt.-Ges. March 6, 1930.

363,423. Alkali chromates, Manufacture of. A. Carpmael. (*I. G. Farbenindustrie Akt.-Ges.*). September 24, 1930.

363,424. Anhydrous hydrofluoric acid and anhydrous fluorides, Manufacture of. A. Carpmael. (*I. G. Farbenindustrie Akt.-Ges.*). September 24, 1930.

363,436. Nitric acid from ammonia, Manufacture of. H. Frischer. October 3, 1929.

363,445. Destructive hydrogenation of carbonaceous materials in the liquid phase. P. J. Askey, R. Holroyd, C. Cockram, and Imperial Chemical Industries, Ltd. October 11, 1930.

363,483. Rubber and rubber-like substances, Manufacture of products from. Imperial Chemical Industries, Ltd., H. M. Bunbury, J. S. H. Davies, and W. J. S. Naunton. November 22, 1930.

363,550. Phosphatic fertilisers, Manufacture of. Soc. Anón. pour le Traitment des Minerais Alumino Potassiques. February 17, 1930.

363,569. Electrodeposition of platinum. A. R. Powell, A. W. Scott, and Johnson, Matthey & Co., Ltd. March 12, 1931.

363,612. Alumina from alkaline earth aluminates, Production of Lonza Elektrizitätswerke und Chemische Fabriken Akt.-Ges. August 21, 1930.

Applications for Patents

[In the case of applications for patents under the International Convention, the priority date (that is, the original application date abroad which the applicant desires shall be accorded to the patent) is given in brackets, with the name of the country of origin. Specifications of such applications are open to inspection at the Patent Office on the anniversary of the date given in brackets, whether or not they have been accepted.]

Albright & Wilson, Ltd., and Beasley, C. H. Apparatus for discharging and conveying liquids. 35990. December 30.

Barlow, C. H., Imperial Chemical Industries, Ltd., and Lawrie L. G. Dyeing. 36123. December 31.

Chinoin Fabrik Chemische-Pharmaceutischer Produkte Akt.-Ges., Dr. v. Kereszty & Dr. Wolf. Production of sensibamine. 36016. December 30. (Hungary, September 17.)

Clapham, J. E., Hailwood, A. J., and Imperial Chemical Industries, Ltd. Manufacture of pigments. 36124. December 31.

Denny, P. W., and Imperial Chemical Industries, Ltd. Stabilisation of chlorinated hydrocarbons. 35840. December 28.

Du Pont de Nemours & Co., E. I. Coating fibrous materials. 36126. December 31. (United States, January 2.)

Durand & Huguenin Akt.-Ges. Production of fast colour reserves under aniline black. 35807. December 28. (Germany, December 27, '30.)

Gasselin, R. Durand-. Manufacture of fertilisers. 36002. December 30.

Goodyear Tire & Rubber Co. Vulcanisation of rubber. 35877. December 29. (United States, May 4.)

Groves, W. W. (*I. G. Farbenindustre Akt.-Ges.*). Manufacture of aroylhalogenphenyl carboxylic acids, etc. 35907. December 29.

Hailwood, A. J., and Imperial Chemical Industries, Ltd. Dyeing cellulose esters and ethers. 36027. December 30.

I. G. Farbenindustrie Akt.-Ges. Manufacture of aromatic amines and coloured pigments. 35813. December 28. (Germany, December 27, '30.)

—— Manufacture of adhesive films for waterproof jointing, etc. 35814. December 28. (Germany, December 27, '30.)

—— Vulcanisation of rubber-like masses. 36109. December 31. (Germany, December 31, '30.)

Kodak, Ltd. Manufacture of carbocyanine dyes. 36103. December 31. (United States, December 31, '30.)

Schering-Kahlbaum Akt.-Ges. Manufacture of aliphatic, etc., oxides. 36107. December 31. (Germany, January 14.)

—— Manufacture of derivatives of 4-pyridone. 36108. December 31. (Germany, January 19.)

Soc. of Chemical Industry in Basle. Dyeing with vat dyestuffs. 35906. December 29. (Switzerland, December 30, '30.)

Anglo-Persian Oil Company

Increase of Capital

AT an extraordinary general meeting of the Anglo-Persian Oil Co., Ltd., held at the offices of the Company, Britannic House, Finsbury Circus, E.C., on December 31, it was unanimously resolved to increase the share capital of the company from £24,000,000 to £26,500,000 by the creation of an additional 2,500,000 shares of £1 each. This increase is necessary to enable the company to implement its offer to the preference shareholders of Scottish Oils, Ltd., the Broxburn Oil Co., Ltd., the Oakbank Oil Co., Ltd., and the Pumpherston Oil Co., Ltd,. to acquire their shares. Sir John Cadman, the chairman, explained that of the total increase contemplated under the resolution 291,130 shares would remain unissued. In reply to questions, he stated that the financial position of the companies whose preference shares were being acquired was definitely good, and that their earnings were sufficient to cover the interest on the preference shares of the Anglo-Persian to be given in exchange.

Chilean Nitrate Research Award

THE 1931 Nitrogen Research Award offered by the Educational Bureau of the Chilean Nitrate Co., U.S.A., and administered by the Standing Committee of the American Society of Agronomy, has been divided equally between Dr. W. H. Pierre, of the Department of Agronomy of the University of West Virginia and Dr. Hans Jenny, of the Department of Soils of the University of Missouri. The award to Dr. Pierre was made in recognition of his work on the effect of the various nitrogenous fertilisers on soil reaction. His work has clearly shown that the continued use of $(NH_4)_2SO_4$ on light, poorly buffered soils will develop within a few years a degree of acidity which is distinctly harmful to many crops. Similar effects are not obtained with the other common nitrogen fertilisers. The award to Dr. Jenny was made in recognition of his work on the effect of climate on the nitrogen content of soils. By a careful correlation of climatic data and of the thousands of nitrogen determinations made on the soils of America, Dr. Jenny has been able to develop an equation of state which shows the general relationship existing between the stable nitrogen content of soils and temperature and rainfall, which are the principal climatic factors affecting it.

The Parent Coal Carbonisation Trust

PRESIDING at a meeting of The Parent Coal Carbonisation Trust, Ltd., held on December 30, Lord Askwith, the chairman of the Trust, said the Board had obtained the funds required to complete the first installation of plant to work the company's process for the low temperature carbonisation of coal on a commercial scale. The Board's chief aim had been to complete the construction and equipment of their works at Belvedere. Certain modifications and adjustments of the auxiliary plant had had to be carried out, but the main plant had worked most efficiently. During this period of testing, the retorts had been in continuous rotation for a period of three months at a time without cessation, and the Board considered that the working of the process had been proved completely successful. A continuous working commercial test of the plant was at the present time being carried out at Belvedere.

London Chemical Market

The following notes on the London Chemical Market are specially supplied to THE CHEMICAL AGE *by Messrs. R. W. Greeff & Co., Ltd., and Messrs. Chas. Page & Co., Ltd., and may be accepted as representing these firms' independent and impartial opinions.*

London, January 7, 1932.

NOTWITHSTANDING the new year holidays, there is a good demand for the various chemicals. Prices continue firm with an upward tendency.

ACETONE.—Is firm at £65/68 per ton, with a satisfactory demand.

ACID, ACETIC.—£37 5s. to £39 5s. per ton for Technical 80%, £38 5s. to £40 5s. per ton for Pure 80% and in good daily demand.

ACID, CITRIC.—Is firm at about 1s. 2d. per lb., less 5%.

ACID, FORMIC.—Is firm at £50 10s. to £52 per ton.

ACID, OXALIC.—£50 per ton in casks and £51 10s. per ton in kegs, firm and in steady demand.

ACID, TARTARIC.—About 1s. 1d. per lb. to 1s. 1½d. per lb., less 5% with prices tending to move upwards.

ALUMINA SULPHATE.—Is very firm at about £8 10s. to £9 10s. per ton.

AMMONIA CHLORIDE.—Owing to the import duty the market for imported material is nominal.

ARSENIC.—The market continues firm at about £24 per ton c.i.f. main U.K. Ports for Imported material, with Cornish at about £28 per ton for forward delivery.

CHLORIDE OF BARIUM.—Is firm at about £11 per ton.

CREAM OF TARTAR.—Owing to the duty the market for the imported article is nominal.

FORMALDEHYDE.—Firm and in good demand at about £30 per ton.

LEAD ACETATE.—White about £43 44 per ton, with Brown £1 per ton less.

LITHOPONE.—Owing to the import duty the market for the imported material is nominal.

POTASH BICHROMATE.—5d. per lb., with the discounts for contracts over the first three months of this year.

POTASH CHLORATE.—Firm at about £32 34 per ton.

PERMANGANATE OF POTASH.—Needle Crystals B.P. firm at 8½d. per lb., and in good demand.

POTASH PRUSSIATE.—In steady request at about 8½d. per lb.

SODIUM ACETATE.—Is firm at about £23 per ton with a good demand.

SODIUM BICHROMATE.—4d. per lb., with discounts for contract over the first three months of this year.

SODIUM CHLORATE.—In good steady request at about £30 per ton.

SODIUM HYPOSULPHITE.—Unchanged.

SODIUM NITRITE.—Firm at £20 to £22 10s. per ton.

SODIUM PRUSSIATE.—Is unchanged at about 5d. to 5½d. per lb.

SODIUM SULPHIDE.—Still continues in good request at the advanced prices.

ZINC SULPHATE.—Steady at about £12 per ton.

Coal Tar Products

THE market for coal tar products remains quiet, and there is no change to report from last week.

MOTOR BENZOL.—Is quoted at about 1s. 4½d. to 1s. 5½d. per gallon f.o.r.

SOLVENT NAPHTHA.—Is obtainable at about 1s. 1½d. to 1s. 2d. per gallon f.o.r.

HEAVY NAPHTHA.—Remains at about 11d. to 1s. ½d. per gallon f.o.r.

CREOSOTE OIL.—Is quoted at about 3d. to 3½d. per gallon f.o.r. in the North, and at about 4d. to 4½d. per gallon in London.

CRESYLIC ACID.—Is unchanged at about 1s. 6d. per gallon f.o.r. for the 98/100% quality, and at about 1s. 4d. per gallon for the Dark quality 95/97%.

NAPHTHALENES.—Remain at about £2 5s. to £2 10s. per ton for the firelighter quality, at about £2 15s. to £3 per ton for the 74/76 quality, and at about £4 per ton for the 76/78 quality.

PITCH.—Is unaltered, at about 67s. 6d. per ton, f.o.b. East Coast Port.

THE following additional market conditions are reported:—

CARBOLIC ACID.—Is a steady market. Prices are unchanged, 5½d. to 6¼d. per lb., according to quantity.

CRESYLIC ACID.—No change. Pale, 97/99%, 1s. 7d. to 1s. 8d. per gallon. 99/100%, 1s. 10d. to 2s., with better grades 2s. 2d. to 2s. 6d.

METHYL SALICYLATE.—Prices unchanged at 1s. 4½d. to 1s. 6½d. per lb.

SALICYLATES.—Business is steady here, and prices remain unchanged. gallon; all in bulk quantities f.o.r. makers' works.

Latest Oil Prices

LONDON, January 6.—LINSEED OIL was barely steady. Spot, ex mill, £16 10s.; January, £13 17s. 6d.; January-April, £14 10s.; May-August, £15 17s. 6d.; September-December, £17 per ton, naked. RAPE OIL was inactive. Crude extracted, £30; technical refined, £32 per ton, naked, ex wharf. COTTON OIL was quiet. Egyptian crude, £18 10s.; refined common edible, £22 10s.; and deodorised, £24 10s. per ton, naked, ex mill. TURPENTINE was steady. American, spot, 51s. 9d.; February-April, 52s. 6d. per cwt.

HULL.—LINSEED OIL.—Spot, £14 10s.; January at £14 12s. 6d.; January-April at £14 15s.; and May-August at £15 15s. per ton, naked. Baltic, spot, £24 10s. COTTON OIL.—Egyptian, crude spot, £18; edible, refined, spot, £20 5s.; technical, spot, £20 5s.; deodorised, £22 5s. per ton, naked. PALM KERNEL OIL.—Crude, f.m.q., spot, £23 10s. per ton, naked. GROUNDNUT OIL.—Crushed extracted, spot, £27 10s.; deodorised, £31 10s. per ton. SOYA OIL.—Crushed/extracted, spot, £20; deodorised, £23 10s. per ton RAPE OIL.—Crushed/extracted, spot, £29; refined, £31 per ton. COD OIL, 16s. per cwt. CASTOR OIL.—Pharmacy, spot, 46s. 6d.; first, 41s. 6d.; second, 39s. 6d. per cwt.

Nitrogen Fertilisers

SULPHATE OF AMMONIA.—*Export.*—The market continues quiet, and the price remains unchanged at £5 5s. per ton f.o.b. U.K. port in single bags. *Home.*—The price remains unchanged, and as usual during this season of the year few sales are made.

IMPORTED NITRATE OF SODA.—The price remains at £8 14s. per ton for January, and £8 16s. per ton for February/June delivered in 6 ton lots to consumers' nearest stations. No movement of the large stocks, which are already in the country, has been reported.

BRITISH NITRATE OF SODA.—Prices, which are on the same basis as for the imported product, remain unchanged.

NITRO-CHALK.—It is reported that merchants and farmers are continuing to book their spring requirements at the price of £7 5s. per ton, and it is anticipated that sales during the coming season will show a considerable advance on last year.

Scottish Coal Tar Products

PRACTICALLY no business has been concluded during the week owing to the holidays. Quotations remain steady in this locality, with supplies of most products rather scarce.

CRESYLIC ACID.—While prices remain somewhat irregular there is more inquiry. Pale, 99/100 per cent., 1s. 4d. to 1s. 5d. per gallon; pale, 97/99 per cent., 1s. 2d. to 1s. 3d. per gallon; dark, 97/99 per cent., 1s. 1d. to 1s. 2d. per gallon; all f.o.r. makers' works. High boiling acid remains scarce, with value steady at 2s. 6d. to 3s. per gallon.

CARBOLIC SIXTIES.—Production is low and makers are well sold for prompt and forward delivery. Value is 1s. 6½d. to 1s. 7½d. per gallon, f.o.r. makers' works for best grades.

CREOSOTE OIL.—Owing to temporary scarcity, prices are somewhat firmer. Specification oils, 2¾d. to 3¼d. per gallon; washed oil, 3½d. to 3¾d. per gallon; gasworks ordinary, 3¾d. to 4d. per

COAL TAR PITCH.—Export value is purely nominal at about 65s. per ton f.o.b. Glasgow. Home demand is taking care of production and makers' are obtaining 62s. 6d. to 65s. per ton ex works for wagon loads.

BLAST FURNACE PITCH.—Stocks are gradually being reduced, but controlled prices remain at 40s. per ton f.o.r. works, and 45s. per ton f.a.s. Glasgow for export.

REFINED COAL TAR.—Inquiries for delivery over the coming season are numerous, but distillers are meantime unwilling to commit themselves to any great extent. Value to-day may be taken at 4d. per gallon f.o.r. naked.

WATER WHITE PRODUCTS.—Are dull with quotations easy. Motor benzole, 1s. 3½d. to 1s. 4½d. per gallon; 90/160 Solvent 1s. 2½d. to 1s. 3½d. per gallon; and 90/190 heavy solvent, 1s. 0½d. to 1s. 1½d. per gallon; all in bulk ex works.

South Wales By-Products

THERE is little change in South Wales by-product activities. Slightly more business has been done and there is a better inquiry than has been the case for some time. The call for pitch continues to be mainly confined to prompt delivery parcels, but the demand generally is steadier. There is no change in values. The road tar demand is sporadic and moderate, with values unchanged round about 13s. per 40-gallon barrel delivered. Refined tars have a fairly steady, if moderate, demand, with quotations unchanged for coke-oven and gasworks tar. Naphthas continue to have a slow market, solvent having only a small call, while there is practically no demand for heavy. Creosote remains weak, but motor benzol continues to be a fairly strong feature. Patent fuel and coke exports are unsatisfactory. Patent fuel prices, for export, are:—19s. to 19s. 6d., ex-ship Cardiff; 18s. to 18s. 6d., ex-ship Swansea. Coke prices are:—Best foundry, 32s. 6d. to 36s. 6d.; good foundry, 22s. 6d. to 25s.; furnace, 17s. to 18s.

Weekly Prices of British Chemical Products

The prices and comments given below respecting British chemical products are based on direct information supplied by the British manufacturers concerned. Unless otherwise qualified, the figures quoted apply to fair quantities, net and naked at makers' works.

General Heavy Chemicals

ACID, ACETIC, 40% TECH.—£18 15s. per ton d/d address U.K. in casks.

ACID CHROMIC.—11d. per lb., less 2½% d/d U.K.

ACID HYDROCHLORIC.—Spot, 3s. 9d. to 6s. carboy d/d, according to purity, strength and locality.

ACID NITRIC, 80° Tw.—Spot, £20 to £25 per ton makers' works, according to district and quality.

ACID SULPHURIC.—Average National prices f.o.r. makers' works, with slight variations up and down owing to local considerations; 140° Tw., Crude acid, 60s. per ton. 168° Tw., Arsenical, £5 10s. per ton. 168° Tw., Non-arsenical, £6 15s. per ton.

AMMONIA (ANHYDROUS).—Spot, 10d. per lb., d/d in cylinders.

AMMONIUM BICHROMATE.—8d. per lb., d/d U.K.

BISULPHITE OF LIME.—£7 10s. per ton, f.o.r. London, packages free.

BLEACHING POWDER, 35/37%.—Spot, £7 10s. per ton d/d station in casks, special terms for contracts.

BORAX, COMMERCIAL.—Granulated, £15 10s. per ton; powder, £17 per ton. (Packed in 1 cwt. bags, carriage paid any station in Great Britain. Prices quoted are for one ton lots and upwards.)

CALCIUM CHLORIDE (SOLID), 70/75%.—Spot, £4 15s. to £5 5s. per ton d/d station in drums.

CHROMIUM OXIDE.—9½d. to 10d. per lb. according to quantity d/d U.K.

CHROMETAN.—Crystals, 3½d. per lb. Liquor, £19 per ton d/d U.K.

METHYLATED SPIRIT 61 O.P.—Industrial, 1s. 8d. to 2s. 3d. per gall.; pyridinised industrial, 1s. 10d. to 2s. 5d. per gall.; mineralised, 2s. 9d. to 3s. 3d. per gall. 64 O.P., 1d. extra in all cases. Prices according to quantity.

NICKEL SULPHATE.—£38 per ton d/d.

NICKEL AMMONIA SULPHATE.—£38 per ton d/d.

POTASH CAUSTIC.—£30 to £33 per ton.

POTASSIUM BICHROMATE CRYSTALS AND GRANULAR.—4⅝d. per lb. net d/d U.K., discount according to quantity; ground 5½d. per lb.

POTASSIUM CHLORATE.—3¾d. per lb. ex-wharf, London, in cwt. kegs.

POTASSIUM CHROMATE.—5½d. per lb. d/d U.K.

SALAMMONIAC.—First lmp, spot, £40 17s. 6d. per ton d/d address in barrels. Chloride of ammonia, £37 to £45 per ton, carr. paid.

SALT CAKE, UNGROUND.—Spot, £3 10s. per ton d/d station in bulk.

SODA ASH, 58%.—Spot, £6 per ton, f.o.r. in bags, special terms for contracts.

SODA CAUSTIC, SOLID, 76/77° E.—Spot, £14 10s. per ton, d/d station.

SODA CRYSTALS.—Spot, £5 to £5 5s. per ton, d/d station or ex depot in 2-cwt. bags.

SODIUM ACETATE 97/98%.—£21 per ton.

SODIUM BICARBONATE, REFINED.—Spot, £10 10s. per ton d/d station in bags.

SODIUM BICHROMATE CRYSTALS, CAKE AND POWDER.—3¾d. per lb. net d/d U.K., discount according to quantity. Anhydrous 4⅝d. per lb.

SODIUM BISULPHITE POWDER, 60/62%.—£16 10s. per ton delivered 1-cwt. iron drums for home trade.

SODIUM CHLORATE.—2¾d. per lb.

SODIUM CHROMATE.—3¾d. per lb. d/d U.K.

SODIUM NITRITE.—Spot, £19 per ton, d/d station in drums.

SODIUM PHOSPHATE.—£15 per ton, f.o.r. London, casks free.

SODIUM SILICATE., 140° Tw.—Spot, £8 5s. per ton, d/d station returnable drums.

SODIUM SULPHATE (GLAUBER SALTS).—Spot, £4 2s. 6d. per ton, d/d.

SODIUM SULPHIDE SOLID, 60/62%.—Spot, £10 5s. per ton, d/d in drums. Crystals—Spot, £8 5s. per ton, d/d in casks.

SODIUM SULPHITE, PEA CRYSTALS.—Spot, £13 10s. per ton; d/d station in kegs. Commercial—Spot, £9 per ton, d/d station in bags.

Coal Tar Products

ACID CARBOLIC CRYSTALS.—5½d. to 6½d. per lb. Crude 60's 1s. 4d. to 1s. 5d. per gall.

ACID CRESYLIC 99/100.—1s. 8d. to 1s. 9d. per gall. B.P., 2s. 6d. to 3s. per gall. Refined, 2s. to 2s. 2d. per gall. Pale, 98%, 1s. 7d. to 1s. 8d. Dark, 1s. 4d. to 1s. 4½d.

BENZOLE.—Prices at works: Crude, 7d. to 7½d. per gall.; Standard Motor, 1s. 2d. to 1s. 3d. per gall. 90%.—1s. 3d. to 1s. 4d. per gall. Pure, 1s. 6d. to 1s. 7d. per gall.

TOLUOLE.—90%, 2s. 4d. per gall. Pure, 2s. 6d. per gall.

XYLOL.—2s. per gall. Pure, 2s. 3d. per gall.

CREOSOTE.—Standard specification, for export, 4¾d. to 5d. net per gall. f.o.b.; for Home, 3¾d. per gall. d/d.

NAPHTHA.—Solvent, 90/160, 1s. 3d. per gall. Solvent, 95/160, 1s. 5d. to 1s. 6d. per gall. Solvent, 90/190, 11d. to 1s. 2d. per gall.

NAPHTHALENE.—Purified Crystals, £11 10s. per ton, in bags.

PITCH.—Medium soft, 70s. per ton, in bulk at makers' works.

PYRIDINE.—90/140, 3s. 9d. to 4s. per gall. 90/160, 4s. to 4s. 6d. per gall. 90/180, 2s. to 2s. 6d. per gall.

Intermediates and Dyes

In the following list of Intermediates delivered prices include packages except where otherwise stated:—

ACID GAMMA.—Spot, 3s. 3d. per lb. 100% d/d buyer's works.

ACID H.—Spot, 2s. 3d. per lb. 100% d/d buyer's works.

ACID NAPHTHIONIC.—1s. 2d. per lb. 100% d/d buyer's works.

ACID NEVILLE AND WINTHER.—Spot, 2s. 6d. per lb. 100% d/d buyer's works.

ACID SULPHANILIC.—Spot, 8¼d. per lb. 100% d/d buyer's works.

ANILINE OIL.—Spot, 8d. per lb., drums extra, d/d buyer's works.

ANILINE SALTS.—Spot, 8d. per lb. d/d buyer's works, casks free.

BENZALDEHYDE.—Spot, 1s. 6d. per lb., packages extra, d/d buyer's works.

BENZIDINE BASE.—Spot, 2s. 3d. per lb. 100% d/d buyer's works.

o-CRESOL 30/31° C.—£2 6s. 5d. per cwt., in 1-ton lots.

m-CRESOL 98/100%.—2s. 9d. per lb., in ton lots.

p-CRESOL 34.5° C.—1s. 9d. per lb., in ton lots.

DICHLORANILINE.—2s. 5d. per lb.

DIMETHYLANILINE.—Spot, 1s. 6d. per lb., packages extra, d/d buyer's works.

DINITROBENZENE.—7¾d. per lb.

DINITROTOLUENE.—48/50° C., 7d. per lb.; 66/68° C., 7¾d.-8d. per lb.

DIPHENYLAMINE.—Spot, 1s. 8d. per lb., d/d buyer's works.

a-NAPHTHOL.—Spot, 1s. 9d. per lb. d/d buyer's works.

B-NAPHTHOL.—Spot, £65 per ton in 1 ton lots, d/d buyer's works.

a-NAPHTHYLAMINE.—Spot, 10½d. per lb. d/d buyer's works.

B-NAPHTHYLAMINE.—Spot, 2s. 9d. per lb. d/d buyer's works.

o-NITRANILINE.—5s. 11d. per lb.

m-NITRANILINE.—Spot, 2s. 6d. per lb. d/d buyer's works.

p-NITRANILINE.—Spot, 1s. 8d. per lb. d/d buyer's works.

NITROBENZENE.—Spot, 6½d. per lb.; 5-cwt. lots, drums extra, d/d buyers' works.

NITRONAPHTHALENE.—8¾d. per lb.

SODIUM NAPHTHIONATE.—Spot, 1s. 6d. per lb. 100% d/d buyer's works.

o-TOLUIDINE.—Spot, 9½d. per lb., drums extra, d/d buyer's works.

p-TOLUIDINE.—Spot, 1s. 6d. per lb. d/d buyer's works.

m-XYLIDINE ACETATE.—3s. 3d. per lb., 100%.

Wood Distillation Products

ACETATE OF LIME.—Brown, £7 10s. per ton. Grey, £12 per ton. Liquor, 8d. to 9d. per gall.

ACETIC ACID, TECHNICAL, 40%.—£16 15s. to £17 15s. per ton.

ACETONE.—£63 to £65 per ton.

AMYL ACETATE, TECHNICAL.—90s. to 98s. per cwt.

CHARCOAL.—£6 10s. to £10 10s. per ton, according to grade and locality.

IRON LIQUOR.—24°/30° Tw., 10d. to 1s. 2d. per gall.

METHYL ACETONE, 40/50%.—£52 per ton.

RED LIQUOR.—16° Tw., 8½d. to 10d. per gall.

WOOD CREOSOTE.—1s. to 2s. 6d. per gall., unrefined.

WOOD NAPHTHA, MISCIBLE.—3s. to 4s. per gall. Solvent, 3s. 9d. to 4s. 9d. per gall.

WOOD TAR.—£2 10s. to £6 per ton.

BROWN SUGAR OF LEAD.—£32 per ton.

Rubber Chemicals

ANTIMONY SULPHIDE.—Golden, 6½d. to 1s. 1½d. per lb., according to quality; Crimson, 1s. 3d. to 1s. 5d. per lb., according to quality.

ARSENIC SULPHIDE, YELLOW.—1s. 5d. to 1s. 7d. per lb.

BABYTES.—£7 to £8 10s. per ton, according to quality.

CADMIUM SULPHIDE.—3s. 6d. to 3s. 9d. per lb.

CARBON BISULPHIDE.—£30 to £32 per ton, according to quantity; drums extra.

CARBON, BLACK.—4d. to 5d. per lb., ex wharf.

CARBON TETRACHLORIDE.—£45 to £55 per ton, according to quantity drums extra.

CHROMIUM OXIDE, GREEN.—1s. 2d. per lb.

DIPHENYLGUANIDINE.—2s. 6d. per lb.

INDIARUBBER SUBSTITUTES, WHITE.—4d. to 5½d. per lb.; Dark, 4d. to 4½d. per lb.

LAMP BLACK.—£46 to £50 per ton.

LITHOPONE, 30%.—£20 to £22 per ton.

SULPHUR.—£12 5s. to £15 15s. per ton.

MINERAL RUBBER "RUPRON."—£18 10s.

PIPERIDINE RUBBER ACCELERATORS.—P.P.D., 10s. 6d. to 11s. 6d. per lb.; Z.P.D., 7s. to 7s. 6d. per lb.; L.P.D., 6s. 6d. to 7s. per lb.; P.T.D., 9s. 8d. to 10s. 4d. per lb.; C.P.D., 8s. 3d. to 8s. 10d. per lb.; S.P.D., 8s. 1d. to 8s. 7d. per lb.; Suparac, Standard, 7s. per lb.; Suparac, Z, 3s. 6d. per lb.

SULPHUR CHLORIDE.—5d. to 7d. per lb., according to quality.

SULPHUR PRECIP. B.P.—£55 to £60 per ton, according to quantity.

SULPHUR PRECIP. COMMERCIAL.—£50 to £55 per ton.

VERMILLION, PALE OR DEEP.—6s. 8d. to 6s. 10d. per lb.

ZINC SULPHIDE.—1s. to 1s. 2d. per lb.

Pharmaceutical and Photographic Chemicals

ACID, PHOSPHORIC (conc. 1.750).—In carboys, 10d. per lb.
BISMUTH CARBONATE.—8s. per lb.
BISMUTH CITRATE.—9s. 9d. per lb.
BISMUTH NITRATE.—(Cryst.), 5s. 1d. per lb.
BISMUTH OXIDE.—11s. 6d. per lb.
BISMUTH SALICYLATE.—8s. 2d. per lb.
BISMUTH SUBCHLORIDE.—11s. 2d. per lb.
BISMUTH SUBGALLATE.—7s. 9d. per lb.
BISMUTH SUBNITRATE.—6s. 8d. per lb.
LIQUOR BISMUTHI.—P.B. in W.Qts 1s. 2d. per lb.; 6 W.Qts 11½d. per lb.; 12 W.Qts 10d. per lb.; 36 W.Qts 9½d. per lb.
MAGNESIUM CARBONATE.—Light, 28s. per cwt.
MAGNESIUM OXIDE.—Light, 70s. per cwt.; heavy, 1s. 8d. per lb.
POTASSIUM BITARTRATE 99/100% (cream of tartar).—103s. 6d. per cwt.

Essential Oils

ANISE.—2s. 4d. per lb.
BERGAMOT.—11s. per lb.
LAVENDER.—Mont Blanc, 38/40%, 11s. per lb.
LEMON.—5s. per lb.
PEPPERMINT.—Japanese, 4s. 9d. per lb.
PETITGRAIN.—5s. per lb.

Scottish Chemical Market

The following notes on the Scottish Chemical Market are specially supplied to THE CHEMICAL AGE *by Messrs. Chas. Tennant and Co., Ltd., Glasgow, and may be accepted as representing this firm's independent and impartial opinions.*

Glasgow, January 5, 1932.

THE Scottish heavy chemical market is making a slow recovery from the New Year holidays.

ACETONE.—B.G.S.—Quoted £65 to £68 per ton ex wharf, according to quantity.

ACID, ACETIC.—Prices ruling are as follows: glacial, 98/100%, £48 to £59 per ton; pure, 80%, £38 5s. per ton; technical, 80%, £37 5s. delivered in minimum lots of 1 ton.

ACID, BORIC.—Granulated commercial, £26 10s. per ton; B.P. crystals, £35 10s. per ton; B.P. powder, £36 10s. per ton, in 1-cwt. bags, delivered Great Britain free in one-ton lots upwards.

ACID, HYDROCHLORIC.—Usual steady demand. Arsenical quality, 4s. per carboy. Dearsenicated quality, 5s. per carboy, ex works, full wagon loads.

ACID, NITRIC, 80° QUALITY.—£23 per ton, ex station, full truck loads.

ACID, OXALIC.—98/100%.—On offer at £51 to £53 per ton, ex store.

ACID, SULPHURIC.—£3 12s. 6d. per ton, ex works, for 144° quality. £7 per ton for 168°. Dearsenicated quality, 20s. per ton extra.

ACID, TARTARIC, B.P. CRYSTALS.—Quoted 1s. to 1s. 0½d. per lb., less 5%, ex wharf.

ALUMINA SULPHATE.—Quoted round about £8 10s. per ton, ex store.

ALUM, LUMP POTASH.—Now quoted at £9 5s. per ton, c.i.f. U.K. ports.

AMMONIA ANHYDROUS.—Quoted 10½d. per lb., containers extra and returnable.

AMMONIA CARBONATE.—Lump quality quoted £36 per ton. Powdered, £38 per ton, packed in 5 cwt. casks, delivered U.K. stations or f.o.b. U.K. ports.

AMMONIA LIQUID, 80°.—Unchanged at about 2½d. to 3d. per lb., delivered, according to quantity.

AMMONIA MURIATE.—British dog tooth crystals quoted round £32 to £35 per ton, carriage paid according to quantity.

ANTIMONY OXIDE.—Spot material obtainable at round about £33 per ton, ex wharf.

ARSENIC, WHITE POWDERED.—Quoted £25 10s. per ton, ex wharf. Spot material still on offer at £26 per ton, ex store.

BARIUM CHLORIDE.—Price about £10 10s. to £11 10s. per ton, c.i.f. U.K. ports.

BLEACHING POWDER.—British manufacturers' contract price to consumers £8 15s. per ton, in 5s. 6d. cwt. casks.

CALCIUM CHLORIDE.—British manufacturers' price, £5 5s. to £5 15s. per ton, according to quantity and point of delivery.

COPPERAS, GREEN—At about £3 15s. per ton, f.o.r. or ex works.

FORMALDEHYDE, 40%.—Now quoted £29 per ton, ex store.

GLAUBER SALTS.—English material quoted £4 10s. per ton, ex station.

LEAD, RED.—Price now £30 per ton, delivered buyer's works.

LEAD, WHITE.—Quoted £40 per ton, carriage paid.

LEAD ACETATE.—White crystals quoted round about £42 to £43 per ton c.i.f. U.K. ports. Brown on offer at about £1 per ton less.

MAGNESITE, GROUND CALCINED.—Quoted £9 10s. per ton, ex store.

METHYLATED SPIRIT.—Industrial quality 64 o.p., quoted 1s. 8d. to 2s. 3d. per gallon.

POTASSIUM BICHROMATE.—Quoted 5d. per lb., delivered U.K. or c.i.f. Irish ports, with an allowance for contracts.

POTASSIUM CARBONATE.—96% to 98%. In fair demand. Spot material on offer, £28 per ton ex store.

POTASSIUM CHLORATE.—99¾/100% Powder.—Quoted £34 per ton ex store; crystals 30s. per ton extra.

POTASSIUM NITRATE.—Refined granulated quality quoted £24 10s. per ton, c.i.f. U.K. ports. Spot material on offer at about £25 per ton ex store.

POTASSIUM PERMANGANATE B.P. CRYSTALS.—Quoted 8½d. per lb. ex wharf.

POTASSIUM PRUSSIATE (YELLOW).—Spot material quoted 8d. per lb., ex store.

SODA, CAUSTIC.—Powdered 98/99%, £17 10s. per ton in drums, £18 15s. in casks. Solid 76/77%, £14 10s. per ton in drums, £14 12s. 6d. per ton for 70/72% in drums; all carriage paid buyer's station, minimum four-toun lots; for contracts 10s. per ton less.

SODIUM BICARBONATE.—Refined recrystallised, £10 10s. per ton, ex quay or station. M.W. quality 30s. per ton less.

SODIUM BICHROMATE.—Quoted 4d. per lb., delivered buyer's premises, with concession for contracts.

SODIUM CARBONATE (SODA CRYSTALS).—£5 to £5 5s. per ton, ex quay or station; powdered or pea quality, 7s. 6d. per ton extra. Light soda ash, £7 13s. per ton, ex quay, minimum four-ton lots, with various reductions for contracts.

SODIUM HYPOSULPHITE.—Large crystals of English manufacture quoted £9 2s. 6d. per ton, ex station, minimum four-ton lots. Pea crystals on offer at £15 per ton, ex station, four-ton lots.

SODIUM PRUSSIATE.—Quoted 5¼d. per lb., ex store. On offer at 5d. per lb., ex wharf to come forward.

SODIUM SULPHATE (SALTCAKE).—Price, 60s. per ton, ex works; 65s. per ton, delivered, for unground quality. Ground quality 2s. 6d. per ton extra.

SODIUM SULPHIDE.—Prices for home consumption: solid 61/62%, £10 per ton; broken, 60/62%, £11 per ton; crystals 30/32%, £8 2s. 6d. per ton, delivered buyer's works on contract, minimum four-ton lots. Spot material 5s. per ton extra.

SULPHUR.—Flowers, £14 per ton; roll, £12 10s. per ton; rock, £11 5s. per ton; ground American, £10 10s. per ton, ex store.

ZINC CHLORIDE 98%.—British material now offered at round about £18 10s. per ton, f.o.b. U.K. ports.

ZINC SULPHATE.—Quoted £11 per ton, ex wharf.

NOTE.—The above prices are for bulk business and are not to be taken as applicable to small parcels.

Protection to Indian Sugar Industry

THE Sugar Committee of the Imperial Council of Agricultural Research which held its sittings recently at New Delhi definitely recommended that the sugar should be declared as a protected industry without delay for a period of at least fifteen years and an annual grant of ten lakhs of rupees should be placed at the disposal of the Imperial Council of Agricultural Research for the development of the sugar industry and sugar cane cultivation. The Committee, among other things, considered the recommendations of the Tariff Board on the Sugar industry and expressed its opinion that there should be no further reference to the Tariff Board before the term of protection of 15 years. It was also urged that the Government should have the power of imposing a deferred duty of eight annas per cwt., as proposed by the Tariff Board and that the exercise of this power should be left entirely in the hands of the Governor-General in Council. The Committee has also endorsed the findings of the Tariff Board in regard to information and returns to be supplied by factories and recommended that cane prices should be posted in conspicuous places also at all cane weighing stations.

Manchester Chemical Market

[From Our Own Correspondent.]

Manchester, January 6, 1932.

Business has been resumed this week on the chemical market here after a seasonally quiet spell, although up to the present, trade has not reached the scale experienced prior to the slackening off before Christmas. Specifications for deliveries are, however, again coming to hand, and may be expected to reach a bigger scale during the next few days. For the time being, at all events, it is probable that the textile finishing industries will continue to take improved quantities of chemical products, for many works in this branch are now fairly actively engaged in dealing with business in cotton and woollen textiles that was booked some time ago. Beyond the immediate future, however, prospects at the moment tend to be rather obscure, and the outlook is not regarded with any too much confidence.

Heavy Chemicals

The demand for phosphate of soda so far this week has been on somewhat quiet lines, but offers of this material keep up at about £13 10s. per ton for the dibasic quality. Bichromate of soda is in moderate request, with values on the basis of 4d. per lb., less 1 to 3½ per cent. in January-March contracts, and 4d. net for spot parcels. Chlorate of soda shows little change on the week, quotations ranging from £30 to £31 per ton. There has been some inquiry about for prussiate of soda, which keeps very firms at from 5d. to 5½d. per lb., for crystals, according to quantity. Caustic soda meets with a fair movement, and contract offers in this section keep up at from £12 15s. to £14 per ton, according to grade. Alkali, also, is well held at £6 per ton, and a quietly steady trade is going through. Bicarbonate of soda is quoted here at round £10 10s. per ton, with saltcake at up to £3 2s. 6d. per ton. The demand for sulphide of sodium this week has been on the slow side, but at about £11 10s. per ton for the 60-65 per cent. concentrated solid material and £9 5s. for commercial values show little change. Hyposulphite of soda is on offer at about £15 per ton for the photographic quality, and round £9 5s. for the commercial material, with a moderate business going through.

In the potash section, a quiet trade is passing in the case of permanganate, with the B.P. on offer at from 6½d. to 6¾d. per lb., and the commercial grade at about 6¼d. Carbonate of potash meets with a moderate inquiry, with prices firm at round £32 per ton. With regard to caustic potash, from £37 10s. to £38 per ton is still being indicated here. Chlorate of potash is rather quiet at the moment but prices are steady at from £34 to £35 per ton. Bichromate of potash is firm at the new level of 5d. per lb., less 1 to 3½ per cent. in contracts, and 5d. net in spot parcels. A moderate business is reported in respect of yellow prussiate of potash, values of which keep up in the region of 8½d. per lb.

Sales of sulphate of copper this week have continued on a rather disappointing scale at from £17 10s. to £18 per ton, f.o.b. Arsenic is still not too plentiful and prices of white powdered, Cornish makes, are nominal at round £26 per ton, at the mines. The lead products are steady although only moderately active, with the acetates at £44 and £41 per ton for the white and brown qualities, and nitrate at about £29. The acetates of lime are slow at from £11 10s. to £12 per ton for the grey material and round £8 for the brown.

Acids and Tar Products

Citric acid is quoted at up to 1s. 2d. per lb., and tartaric at 1s. 1¼d. Oxalic acid is firm at £2 10s. per cwt., ex store, although only quiet sales have been reported this week. There has been no quotable change in the position of acetic acid, the technical glacial material offering at £52 per ton and the 80 per cent. commercial at 39s. 5d.

In the by-products market, pitch meets with a moderate demand, with prices ranging from 70s. to 75s. per ton, f.o.b. The movement of creosote oil is of limited dimensions, with current values at from 3¼d. to 4½d. per gallon, naked, according to grade. Carbolic acid keeps up at from 1s. 7½d. to 1s. 8d. per gallon, naked, for the 60's crude, with crystals at round 6½d. per lb., f.o.b. Solvent naphtha is firm at about 1s. 3¾d. per gallon for the 90/160's.

Company News

Nitrate Railways Co.—The traffic receipts for the year 1931 were £136,086, which is a decrease of £290,688 on the previous year.

British Oil and Cake Mills, Ltd.—The directors have declared an interim dividend of 6 per cent., less tax, on the ordinary shares.

Tarmac, Ltd.—The directors, it is announced, have authorised payment (January 1) of a dividend on the company's 5½ per cent. (free of tax) cumulative preference shares in respect of the half-year ending December 31, 1931.

Solidol Chemical Co.—The accounts for the year to September 30 last show a net loss of £3,666, against a profit of £276 in the previous year. After deducting £2,634 brought in, there is a debit of £1,032 to be carried forward.

Anglo-Persian Oil Co., Ltd.—A resolution to increase the share capital of the company from £24,000,000 to £26,500,000 by the creation of an additional 2,500,000 shares of £1 each was passed at an extraordinary general meeting in London on December 31. This increase, it is stated has become necessary to enable the company to implement its offer to the preference shareholders of Scottish Oils, Ltd., the Broxburn Oil Company, Ltd., the Oakbank Oil Company, Ltd., and the Pumpherston Oil Company, Ltd., and to acquire their shares.

Briton Ferry Chemical Co.—In a circular to shareholders it is stated that following information conveyed to shareholders by circular at the end of June concerning last season's unprofitable trade in superphosphate due to continued dumping of foreign material, the directors state that although the sale of the company's brand of other products has been maintained during the past six months, the general trading conditions have remained unsatisfactory, and there are no profits from which to pay interest on the 7 per cent. cum. preference shares for the year 1931.

Turner and Newall, Ltd.—The preliminary statement for the year ended September 30 last shows that trading profits, before providing for depreciation, taxation, and directors' fees, but after providing for losses of subsidiary companies, amounted to £530,037. After allowing for depreciation, directors' fees, and taxation, which absorbed £169,158, the net profit was £360,879, and £17,252 was brought in. The directors recommend a final dividend of 2½ per cent. on the ordinary shares, making the distribution for the year 5 per cent., leaving a balance of £34,840 to be carried forward. A dividend amounting to £157,210 received from the Rhodesian and General Asbestos Corporation, Ltd., during the year, but earned in the previous trading year, has been used to write down trading stocks. The net profit for the preceding year, after providing for depreciation, directors' fees, income tax, and expenses of amalgamations, was £829,768, to which was added £129,000 balance on purchase account of Bells United Asbestos Company. The sum of £150,000 was placed to investment reserve and a like amount to general reserve, and the dividends on the ordinary shares totalled 11¼ per cent. The annual general meeting will be held at York, January 28.

Paper Pulp Trade in Sweden

The sales of sulphite pulp during August-September were relatively inconsiderable, amounting to about 30,000 tons for each month, and the level of prices further weakened. As has been previously mentioned, an agreement was entered into last autumn by the manufacturers of Europe to reduce production by 15 per cent. during the period October 1, 1930-December 31, 1931, with the object of stabilising the market. It has since been decided to increase this reduction to 30 per cent. for the period July 1, 1931-June 30, 1932, and for the last half of 1932 to maintain the reduction of 15 per cent. On the other hand, sales of sulphate cellulose have been satisfactory in quantity, although a fairly appreciable decline was noticed during September. Prices have been maintained at about the same level as previously. During the early autumn the markets for mechanical pulp were lifeless, and prices weak. The currency crisis in England and Sweden have not yet resulted in any improvement in the situation as regards either sales or prices.

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MANUFACTURED in a range of sizes from 6 to 1200 cubic feet per minute capacity, the "Broomwade" Rotary Machine is super-efficient, and its running speed and low starting torque enable it to be direct coupled to comparatively high speed squirrel-cage motors or other forms of driving units.

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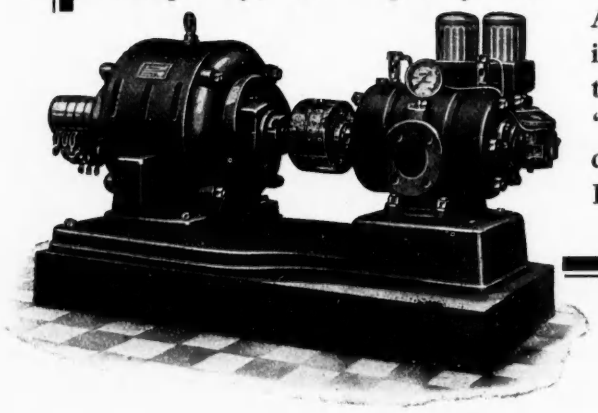

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Commercial Intelligence

The following are taken from printed reports, but we cannot be responsible for any errors that may occur.

Mortgages and Charges

[*NOTE.—The Companies Consolidation Act of 1908 provides that every Mortgage or Charge, as described therein, shall be registered within 21 days after its creation, otherwise it shall be void against the liquidator and any creditor. The Act also provides that every Company shall, in making its Annual Summary, specify the total amount of debts due from the Company in respect of all Mortgages or Charges. The following Mortgages and Charges have been so registered. In each case the total debt, as specified in the last available Annual Summary, is also given—marked with an *—followed by the date of the Summary, but such total may have been reduced.*]

MANCHESTER CELLULOSE FINISHES, LTD. (M., 9/1/32.) Registered December 22, £650 and £300 debentures, to W. I. Scholes, 130 Church Street, Eccles, and R. F. Swinn, 34 Upper Duke Street, Hulme, Manchester; general charges (subject, etc.). *£2,989. May 5, 1931.

Satisfaction

SAVORY AND MOORE, LTD. (late SAVORY AND MOORE (1928), LTD.), London, W., chemical manufacturers, etc. (M.S., 9/1/32.) Satisfactions registered December 22, £45,000, registered January 25, 1929, £45,000 (not ex.), registered January 29, 1929, £50,000, registered October 6, 1930, £40,000, etc., registered November 12, 1930, and all moneys, etc., registered January 26, 1931.

County Court Judgment

[*NOTE.—The publication of extracts from the "Registry of County Court Judgments" does not imply inability to pay on the part of the persons named. Many of the judgments may have been settled between the parties or paid. Registered judgments are not necessarily for debts. They may be for damages or otherwise, and the result of bona-fide contested actions. But the Registry makes no distinction of the cases. Judgments are not returned to the Registry if satisfied in the Court books within twenty-one days. When a debtor has made arrangements with his creditors we do not report subsequent County Court judgments against him.*]

R. A. DENNE, Woodhouse Works, Brighouse, research chemist. (C.C., 9/1/32.) £30 18s. 0d. November 27.

New Companies Registered

BRITISH CARBIDE CALCIUM, LTD. Registered January 2. Nominal capital £10,000 in 7,000, 25 per cent. non-cumulative preference shares of £1 and 12,000 ordinary shares of 5s. each. To adopt an agreement with E. J. Heinz, and to carry on the business of manufacturers of and dealers in carbide, chemicals, patent fuel and coke, carbonisers and distillers of coal, shale, and other substances, manufacturers of and dealers in gas, drugs, medicines, disinfectants, gypsum disinfectants, fertilisers, oils, colours, varnish compositions, motor spirit, naphtha, benzenes, etc. A subscriber: Mary K. Dahl, "Laurwig," Bramber Road, N. Finchley, London, N.12.

BRITISH IRON OXIDES, LTD.—Registered December 18. Nominal capital £5,000 in £1 shares. To search for, raise and work coal, iron, ore, tin, zinc, copper, gold, silver and any other minerals, and to carry on the business of colliery and mine proprietors, mining engineers, etc. A subscriber: H. W. Fenney, 38 Gresham Street, London, E.C.

CENTURY SOAP, LTD., Walsingham House, Seething Lane, London, E.C.3. Registered January 1. Nominal capital £5,000 in 200 shares of £25 each. To adopt an agreement with J. B. E. Johnson and W. K. F. Morrice, to acquire the benefit of a licence to use and exercise a process for the manufacture of soap and glycerine granted to the said J. B. E. Johnson, and to carry on the business of soap manufacturers, etc. Directors: E. D. Money, J. B. E. Johnson, and W. K. F. Morrice.

GLOVERS (CHEMICALS), LTD.—Registered December 21. Nominal capital £5,000 in £1 shares. Manufacturers of, agents for and dealers in general, heavy, pharmaceutical and colonial chemicals, soaps and solvents, dry, mineral and coloid colours, dyes, coal tar, intermediate products, natural and synthetic drugs, artificial and synthetic silk and artificial cosmetics, etc. Directors: H. Glover, Wyther Lodge, Armley, Leeds; N. Glover.

LOWER TEMPERATURE COAL PRODUCTS, LTD., 14 Regent Street, London, S.W.1.—Registered as a "public" company on December 16. Nominal capital £50,000 in £1 shares. To adopt an agreement with Société Anonyme Disticom, to carry on, develop and turn to account patents and patent rights, to manufacture, deal in and render saleable, oil, coal, coal tar, pitch and other residual products from coal; to undertake the erection of plant and the maintenance thereof, etc. Directors: R. Hottat, 35 Rue Philippe le Bon, Brussels; M. Migeon, L. Vogel.

MELANOID, LTD. Registered December 15. Nominal capital £100 in £1 shares. To adopt an agreement with the South Staffordshire Mond Gas Co. for the acquisition (inter alia) of the trade mark "Melanoid" and to carry on the business of manufacturers and distillers of tar, pitch and oils, paints, disinfectants, preservatives, moulding and other compounds, chemicals, soap and toilet requisites, etc. A subscriber: E. Howe, The Quarries, Upper Gornal, near Dudley. So long as the South Staffordshire Mond Gas Co. hold (whether or not subject to charges) three-quarters of the issued shares, they shall be sole directors and managers.

Tariff Changes

URUGUAY.—A recent Uruguayan Law provides for the creation in Uruguay of a "National Administration of Fuel, Alcohol and Portland cement," with the duties of exploiting and administering a State monopoly of Uruguayan alcohol and fuel; of importing, rectifying and selling petroleum and its derivatives; and of manufacturing cement. The Law makes provision for the reservation to the State of the following rights:—(a) The import, export, manufacture, rectification, denaturation and sale of alcohol and of Uruguayan fuels, which may be extended wholly or partially to distilled alcoholic beverages at the discretion of the monopoly; (b) The import and refining of crude petroleum and its derivatives; (c) The import and export of liquid, semi-liquid and gas fuels, whatever their state and composition, when the State refineries produce at least half the petrol (naphtha) consumed in the country.

NORWAY.—The due imposed on all fat emulsions and artificial lard imported into, or manufactured in, Norway now amounts to 10 öre per 100 kilogs. net weight.

FEDERATED MALAY STATES.—The "Government Gazette" (November 6) contains a Notification which extends the control over deleterious drugs in the States to apply to di-hydro-morphine and all esters of morphine, including any preparation, admixture, extract.

BRITISH INDIA.—The "Gazette of India" (November 16) contains a Notification which reduces the duty on salt imported into British India from 5 annas 7½ pies to 4 annas 6 pies per maund (82 2/7 lb.). The excise duty of 1 rup. 9 annas per maund is payable in addition, so that the total duty now amounts to 1 rup. 13 annas 6 pies per maund.

Chemical Trade Inquiries

These inquiries, abstracted from the "Board of Trade Journal," have been received at the Department of Overseas Trade (Development and Intelligence), 35 Old Queen Street, London, S.W.1. British firms may obtain the names and addresses of the inquirers by applying to the Department (quoting the reference number and country) except where otherwise stated.

CEYLON.—A firm of motor engineers in Colombo desire agency for nitro spray paint. (Ref. No. 8.)

STRAITS SETTLEMENTS.—The Singapore Municipality Water Department is calling for tenders, to be presented in London or Singapore by March 14, for the supply of sluice valves required for the period May 1, 1932, to April 30, 1933. (Ref. G.X. 11045.)

GERMANY.—The Commercial Secretary to H.M. Embassy at Berlin reports that he has received an application for the addresses of British manufacturers of:—(1) Automatic-pneumatic displacement pumps; (2) automatic return-air displacement pumps; (3) displacement pumps for inflammable liquids; (4) automatic acid eggs. (Ref. G.X. 11049.)